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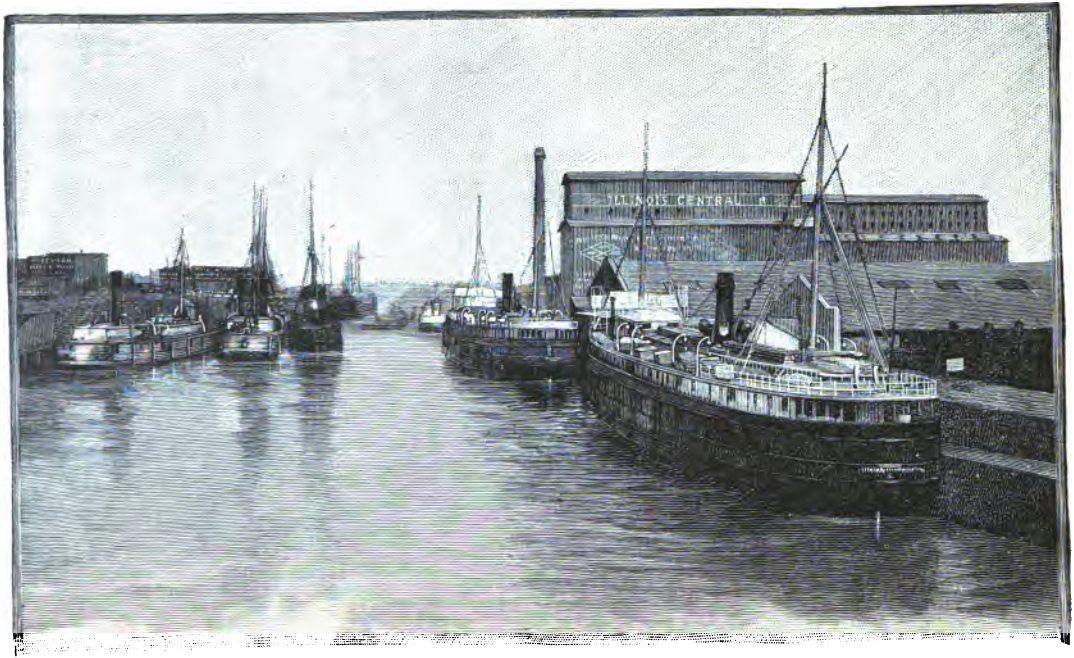

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ORIEL

GEOGRAPHICAL READER.

Book Seven. The United States.

1.—HOW COLUMBUS REACHED AMERICA.

1. More than four hundred years ago, there might have been seen knocking at the door of a convent, not far from Seville, a weary, dusty stranger. He was leading by the hand a young lad, and the couple were evidently poor, for they had travelled on foot, and were now craving a night's lodging and food from the Father Superior.

2. To-day, as we write these lines, a large section of the civilised world has gathered together to do honour to the memory of this man. Then, he was unknown, friendless, and despised; now, the representatives of both Old and New Worlds have combined to place on record the indebtedness of the human race to this man and his work.

3. As you may have already guessed, this poor traveller was none other than the now famous

Christopher Columbus; who, with his little son Diego, was on his way to seek an interview with the King of Spain. He had hopes that, when he told his story, the King would help him. But what was the story he had to tell? When told to the King and councillors of the Court of Spain, it seemed like the dream of a madman.

4. It was neither more nor less than a scheme to cross the then unknown Western Ocean in search of a new continent. We who live in the nineteenth century, and only a pleasant six days' trip from the land of which he was in search, can scarcely imagine how ridiculously daring was the scheme of this grey-haired man.

5. We must remember it was then beginning to dawn on a few minds that the world is a huge globe. Only scholars and thinkers had ceased to regard the earth as a flat plain bounded by an ocean which none might cross. Ships, in those days, never ventured out of sight of land. True, the greater part of the coasts of Africa had been discovered, and the existence of India was known to the peoples of Spain and Portugal. But no attempt had been made to cross the wide Western Sea.

6. Ships had been driven from land by stormy easterly gales; none had ever returned to tell their story, and no living soul had ever fathomed the mystery of that wild ocean. "No mariner

dare enter its deep waters. Its profound depth, its mighty fishes, and haughty winds terrified the would-be traveller." These words are a translation of a Latin writer. They show the terror which this ocean inspired in bygone days.

7. No wonder then that the Junto[1] of King John of Portugal laughed poor Columbus to scorn, and sent him off to try his luck in Spain. The Spanish king was kinder than the Portuguese monarch, and promised him help when the priests and scholars of Salamanca had discussed his scheme. Salamanca was the Oxford of Spain—the seat of learning and the site of many colleges.

8. It must have been a curious sight to see this Columbus—now well-nigh sixty years of age—pleading his cause with all the vigour and fiery imagination of youth, whilst his audience, the dignitaries of the church and professors of colleges, listened with rapt attention to what they thought were the wild outpourings of a maniacal mariner.

9. Their replies to his arguments were somewhat curious when read in the light of what we now know. "Is there anyone so foolish as to believe that there are Antipodes to where we now sit; that people walk with feet facing ours? Do things in this new land grow topsy-turvy? Does the rain ascend and the snow fly upwards?

10. "Even if our good Columbus reaches this

[1] Legislative Assembly.

COLUMBUS AT SALAMANCA.

imaginary land, how will he get back? If the earth is round, as he says, will not the waters form a kind of mountain up which he could not sail?" These were the questions which the wise men of Salamanca had to ask this Ancient Mariner who was destined to connect the Old World with the New.

2.

1. Like most men who are terribly in earnest, Columbus had his own way at last; and, in 1492, he steered for the open Atlantic. His crews were filled with all kinds of strange misgivings; they had neither faith nor hope; their leader had an uncommon share of both.

2. But let us now inquire what made this man so confident that land lay where no one else had thought of looking for it. Some of the facts he laid before the *savants* of Salamanca were the common property of all who dwelt by the sea-shore. Hundreds besides Columbus knew that trunks of a kind of tree unknown in Europe, Asia, or Africa had been wafted ashore at various places.

3. Two dead bodies of men of an unknown race had been picked up at sea, and strange birds had visited Spain and Portugal after a long continuance of westerly gales. But it was left for Columbus to find out the true bearing of all these

facts. Just as millions of apples had fallen before Newton's time without anyone asking why they fell, so it required a Columbus to point out that both trees and men must have grown or lived in an unknown land, and that it must lie in the direction from which these things had come.

4. Further, Columbus was a great student of maps. He was constantly poring over the imperfect charts of his day, and it seemed to him contrary to the nature of things that the great land masses of the Old World had no counterpart in the vast watery wastes with which his maps were filled towards the west. There must be islands, if not a new continent, somewhere in the direction of the setting sun!

5. Tradition has it that an old sailor, whom Columbus had befriended, had actually seen this land, and had, on his death-bed, imparted to Columbus many secrets concerning it. This story has never been verified, and is, probably, the invention of an enemy.

6. We shall, in another chapter, describe the vessels which carry the modern voyager across the Atlantic; but here, it is well to remember that the first voyage was accomplished in ships very little larger than a Brixham trawler or a Grimsby smack. Certainly they were not so safe, for only one of the ships was decked, whilst the other two were little better than open boats. No insurance

company would accept a premium from Columbus did he sail in these days.

7. Hardly, then, was the little expedition out of sight of land, when its troubles began. The needle in the compass began to show strange variations. It seemed as if the very laws of Nature were changing; for, according to the needle, the sun did not rise in his proper place.

8. Then they fell in with the regular north-east trade winds. Day after day they had delightful weather, but the winds persistently blew in one direction, as if to prevent their ever returning. They were pleasantly, but surely, drifting to certain destruction. Then came a long sojourn in a weed-covered sea. Every day they expected to come across hidden rocks. But Columbus alternately

coaxed and threatened his crew, and succeeded in keeping up their spirits until they sighted the Bahamas.

9. There we must leave him. It is sad to think that he died neglected and in penury, and quite ignorant of the real grandeur of the discovery he had made. "How would he have been con-

soled," says Washington Irving, "could he but have anticipated the splendid empires which would arise in the beautiful world which he had discovered, and the nations and tongues and languages which were to fill its lands with renown, and to revere and bless his name to the latest posterity."

3.—THE MODERN VOYAGE TO AMERICA.

1. Nothing, perhaps, would better show the progress which the world has made since the time of Columbus than to describe an Atlantic voyage of the present day. We have shown how the voyage was made four hundred years ago; how it required all the genius of the commander of the **Santa Maria,** first, to get a crew, and then, to keep them together and in good spirits till the Atlantic was crossed.

2. No troubles of this kind await the captain of a Cunarder. His ship is really a magnificent floating palace, in which the food supply is equal, if not superior, to that in a first-class hotel. His officers and crew are tried men, and his vessel, if it be the **Campania,** the finest that floats. We simply say the Campania, because it is the latest of the Atlantic greyhounds, and will form our best contrast to the Santa Maria of Columbus.

3. Contrasts are usually made by means of figures, but these can only help us to a very slight degree, so dissimilar are the things compared. In size alone one ship is forty times larger than the other, whilst in the matter of safety we cannot compare the vessels at all. It is the proud boast of the great Cunard Company that they have never lost a passenger. The man who walks down Fleet Street runs a greater risk of losing his life

than he who ventures across the Atlantic in one of these vessels.

4. As safe as the ark and as swift as a train will soon be the absolute truth when written of the modern Atlantic liner, for here is what is done to ensure both of these essentials, safety and speed.

5. We select the Cunard Company as our exemplar, because it has just completed its jubilee as an ocean carrier.

6. Every man on board the ships has his own special work to do, so that, no matter where he may be, let but the signal sound, and a moment after he is in his appointed place.

7. Every ship, too, is built in watertight compartments. There are really so many independent sections riveted together. One section may be crushed by an iceberg, or pierced by a rock, without in any way endangering the lives of those on board.

8. A few words about the speed of the Atlantic liners. From New York to Queenstown is a distance of two thousand nine hundred miles. This distance has been done by the Campania in five days seventeen hours, giving an average of rather over twenty-one knots an hour. This is quite the rate at which a parliamentary train travels.

9. In order to obtain this enormous speed, the vessel is fitted with twelve boilers, each having

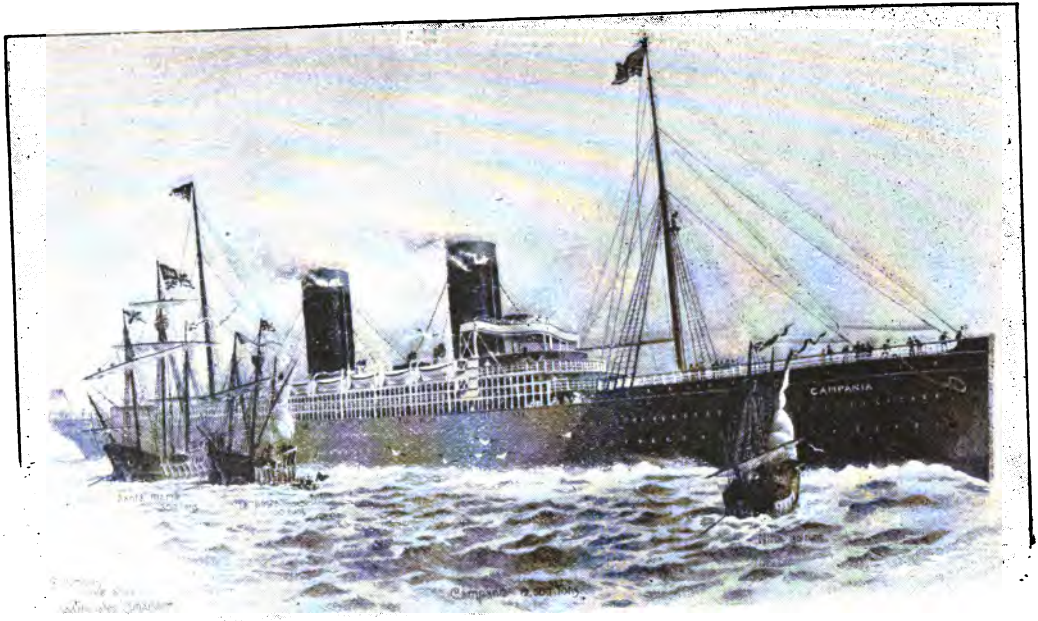
eight furnaces. This means that ninety-six large fires have to be kept going. Lest the heat should reach other parts of the ship where it is not wanted, the boiler and engine-rooms are lined with thick felt, so that one may sleep or dine within a few feet of a raging furnace and yet be quite cool.

10. The smoke from these ninety-six fires is carried off by two enormous funnels, each of which has been compared to the Eddystone Lighthouse for height and diameter. The hulls of all three vessels of Columbus could easily have been stowed away in the funnels of the Campania.

4.

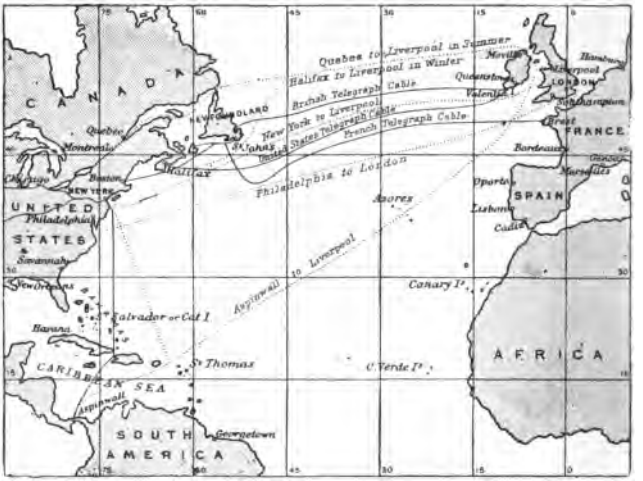
1. The voyager to America has a choice of several **routes.** He may start either from Glasgow, Liverpool, or Southampton, and finish his voyage at Boston or New York. Nearly all vessels call at Queenstown, in Ireland, as a ten hours' sea voyage is saved by taking a railway ticket from London to Cork. This saving of time seems very trifling, yet there are always a few passengers who seem incapable of catching a train or steamer, and the call at Queenstown is a boon to such persons.

2. To most people an Atlantic voyage is full of interest and excitement. Whether it is the absence of those small worries we have ashore, or the


CAMPANIA

exhilaration produced by sea air, we know not, but passengers become excited on the smallest provocation. A passing vessel, a spouting whale, or a towering iceberg, become at once objects of the most intense curiosity and importance.

3. But above this, the question most frequently asked is, "What shall we eat and drink?" The briny breeze—for there is always a breeze on an



ATLANTIC ROUTES.

Atlantic liner—is responsible for this. People are always eating at sea. The cooks begin work at half-past five in the morning, and from that early hour, till seven o'clock at night, they are kept more or less busy.

4. The provisions laid in by a Cunarder for a single voyage bear striking testimony to the keen

appetites of those who travel by sea. Fancy six tons of beef, three of mutton, veal, and pork, well-nigh two thousand fowls, chickens, ducks, geese, one thousand quarts of milk, and twelve thousand eggs, all consumed on one trip. The consumption of eggs averages one a minute from the time of leaving Liverpool until the arrival at New York.

5. When not engaged in eating, the passengers are either reading or speculating on seemingly small matters connected with the voyage. Every one is anxious to know, to a yard, exactly how far the vessel has run in the preceding twenty-four hours. Every now and again the figures are posted up, and we can easily imagine the excitement of those on board when the record distance for a day, five hundred and seventeen miles, was shown on the notice board.

6. As the vessel nears the shore, the excitement becomes intense. Although only five days at sea, every one is feverishly anxious to get on shore again. Long before land is sighted, the pilot is on the look-out for the vessel, and the passengers are on the look-out for the pilot.

7. At last the Liberty Statue is in sight; and, in a short time, our big vessel is safely berthed, having passed through the dock gates with only a few inches to spare.

5.—A GENERAL VIEW.

1. The Continent of North America is now almost entirely in the hands of **two English-speaking peoples,** who, until the reign of George the Third, had the same history. We have in another place[1] shown how the American people, as the natives of the United States call themselves, came to break away from the mother country. We showed how a sort of family squabble led to a rebellion, which ended in the then colony becoming an independent nation.

2. It is only a little over one hundred years ago since this happened, and that little band of colonists has grown to over sixty millions of people. They have extended their borders from the Atlantic to the Pacific, and from Canada to the Gulf of Mexico. Their cities now take rank with the oldest capitals in Europe for size, population, and the magnificence of their public buildings.

3. The Americans are, perhaps, more absolutely **self-contained** than any people on the globe. Within the borders of their land are found vast coal and oil fields, and immense areas suitable for corn-growing. Valuable forests yet cover much of the country. Their lake and river systems give them some thousands of miles of navigable water.

[1] See Oriel Geographical Reader, Book Five, p. 18.

Canada only can at all compare with the United States in this respect.

4. With a population less than one-fifth that of Europe, they have a greater railway mileage than Europe, Asia, and Africa combined. This fact alone will give some idea of the energy and enterprise of the Americans. At one bound the people of the United States have made their land the **first agricultural country** in the world.

5. Their commerce is rapidly growing. It has increased tenfold in fifty years, and the country now takes rank as the **third commercial nation** of the world. With the single exception of London, New York does more trade than any other seaport on the globe.

6. Their form of government admits of the greatest freedom for the individual. Every State of the Union frames its own laws, and every man has a voice in the making of those laws. Generally speaking, its people are well educated, and it is an exceedingly rare thing to find a native-born American who can neither read nor write. He lives in the only country in the world which spends more on education than in war, or preparations for war.

7. In the chapters which succeed, we shall tell you more of this country—something of its great rivers and boundless plains, its forests and prairies, and its great natural resources. When all these

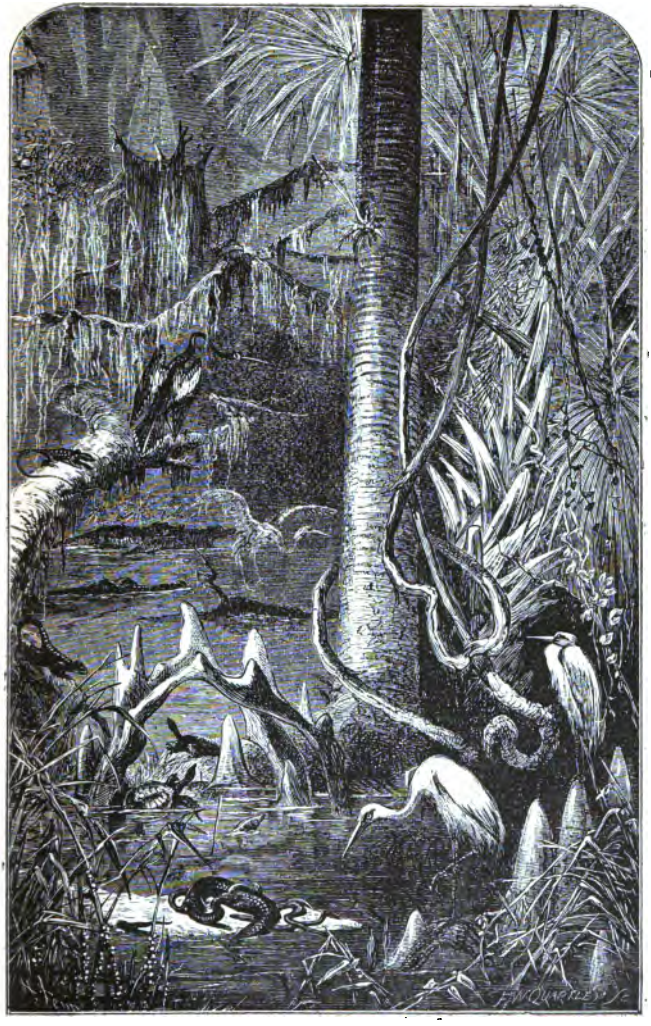
are considered, together with its varied climate, and the wonderful energy and enterprise of its people, you will see why this, one of the youngest of countries, already occupies such an important position amongst civilised nations.

6.—PHYSICAL FEATURES.

1. The physical features of the United States are on an exceedingly grand scale. The "bigness" of his country is the standing boast with the average American. Rivers, mountains, lakes, and plains are all among the largest of their kind. The Americans are proud of this fact, for it seems to show that they themselves are destined to occupy a large place in the history of mankind.

2. The plan on which the United States is moulded, so to speak, is exceedingly simple. Take a large triangle pointing southwards, and, midway between base and apex, slice off a piece, and the remainder gives us a fairly good idea of its shape. On the western side place two almost parallel ranges of lofty heights, enclosing an elevated plateau.

3. On the eastern side place a system of shorter and lower ranges, the **Appalachians**; fill up the wide valley between with a mighty river, the **Mississippi,** and its tributaries; and you get a general idea of the configuration of the United States.



FLORIDA SWAMP.

4. One sees at a glance how dissimilar this is to Europe. Europe has at least ten well-developed river systems; the United States has only four. The great mountain systems run east and west in Europe; in the country we are studying, they run north and south. The United States is a compact land mass; Europe is broken up by inland seas and peninsulas.

5. The **Gulf of Mexico** takes the place of the Mediterranean. It lies further south than the European sea, and is consequently more tropical in character. The sea coast is here fringed by long, low islands, covered with rank vegetation, and behind these are shallow lagoons, the home of the turtle and alligator.

6. The rivers here are mud-laden, and blocked at their mouths with sand and mud bars. For miles inland are found dreary swamps, crossed by meandering streams of foul water. All of this forms a direct contrast to the bold and mountainous shores of Spain, Italy, and Greece.

7. The one peninsula pointing towards the Gulf of Mexico is called **Florida.** It is low, and in many places swampy; but, like Spain and Italy, it is the land of the orange and the lemon.

8. Generally, we may say that the surface of the United States presents two nearly equal divisions of widely different character—a high western half and a low eastern half. The western half is a broad highland; the eastern half is a gently descending slope.

7.—ATLANTIC AND PACIFIC COASTS.

1. The **Atlantic Coast** of the United States is divided naturally into two parts by the "Stormy Cape"—Hatteras. South of this, to the peninsula of Florida, the coast resembles that bordering the Gulf of Mexico. Florida itself is mainly of coral formation, like the islands which lie off its coast.

2. As we sail northward from Cape Hatteras, the coast is more broken, and bolder in character. The inlets are deeper and longer, the swamps disappear, and the rivers are no longer mud-laden. In this section are the great bays of Chesapeake and Delaware, and, further north, Long Island Sound and Massachusetts Bay.

3. On the shores of this latter bay lies the great "Pilgrim Rock," with 1620 carved on it. Here it was that a small party of Nottinghamshire Independents landed from the *Mayflower*, and founded the Puritan colony of **New England.** The climate was like that of England, and the struggle for existence kept them industrious. The influence of these "Pilgrim Fathers," as they were called, can be traced to this day amongst the people of New England. They are noted for their good farming, industrious habits, and simple, Puritan faith.

3. The **Pacific Coast** stretches from the 38th

THE COAST OF MAINE.

parallel to Vancouver Island. With the exception of the Bay of San Francisco there are no inlets of any note, and only a few rocky islets vary, in any way, the uniformity of the coast.

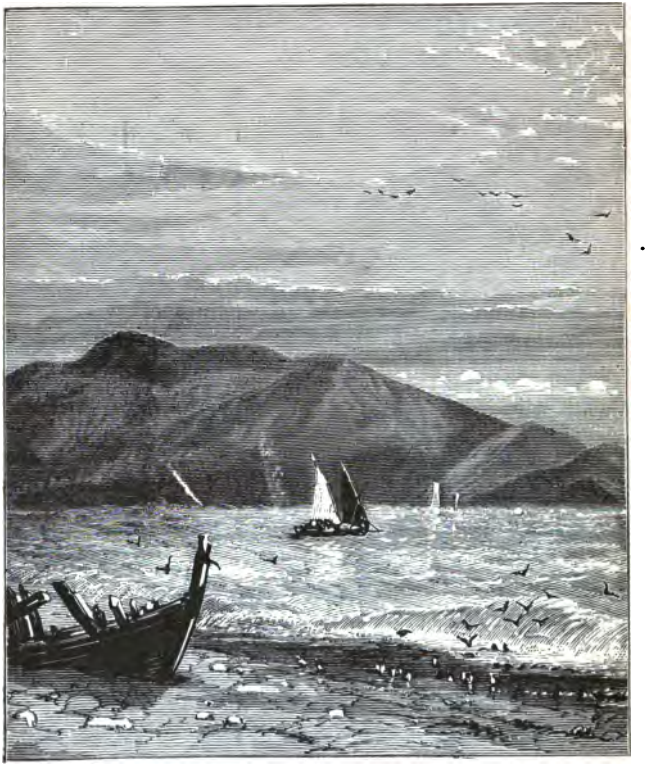
4. The great Pacific mountain system runs in parallel chains, and is never far distant from the shore. The coast is well watered, especially in winter. The prevailing winds are from the Pacific, and, being moisture-laden, they give rise to innumerable mountain torrents.

5. Away in the extreme north of the continent lies **Alaska,** which was ceded by the Russians to the United States in 1867. Spurs of the Rocky Mountains occupy the whole five hundred and eighty thousand square miles of the territory. Many of the peaks are volcanic, and so high as to be perpetually snow-clad. The coast-line resembles that of Norway and Sweden, being broken up by fiords and rocky islets.

6. Alaska approaches within thirty-two miles of the shores of Asia, and was discovered by a Cossack traveller in 1728; but eighty years later came Behring, who explored the whole district more carefully, and gave his name to the strait which now separates America from Asia.

7. Towards the north, the United States are separated from Canada by a narrow strip of land running along the 49th parallel of latitude. The country is here staked out by large posts, which

serve as reminders to the border dwellers that the laws and regulations on one side do not hold on the other.



POINT SAN PEDRO.

8. The Rainy River, the Great Lakes, and the St. Lawrence serve the same purpose further east.

8.—THE APPALACHIANS.

1. The mountains on the eastern side of the Mississippi are known as the **Appalachian system.** They are nowhere more than six thousand feet in height; indeed, they average no more than two thousand; yet, as pleasure resorts, and as natural depôts for coal, iron, and oil, they are quite as important as the grander systems on the Pacific slope.

2. This mountain system is divided into two parts by the great **Appalachian Valley.** It runs from New York along the Hudson River, passes Lake Champlain, and is continued in the St. Lawrence. To the south of New York it becomes the Cumberland Valley, and can be traced through Virginia into Tennessee.

3. This great valley ranges from fifteen to sixty miles in width; and in it are situated flourishing towns, rich coalfields, productive oil wells, as well as traces of gold, silver, copper, sulphur, and a variety of other minerals.

4. The coal of this region is mostly of the smokeless kind, known as anthracite. We have some of the same kind in Wales; and, wherever it is found, we know that, in bygone ages, after the coal was laid down, it was subjected to great heat and pressure, the gases were driven off, leaving only a hard, compact, and partly consumed coal.

5. It is difficult to ignite, but, when fairly started,

a fire of anthracite coal burns with a bright glow and a fierce heat, and is almost smokeless. This last quality makes the air of New York and Pennsylvania compare very favourably with that of London or Liverpool.

6. The first settlers looked with suspicion on this "stone coal," as it was called. In 1814, the city authorities of Pennsylvania purchased some to supply their pumping engines. They spent several days in trying to make it burn, and at last, in disgust, they had it broken up to cover the walks of the town. In 1820, only four hundred tons were used; now over one hundred and twenty million tons are consumed annually.

7. Anthracite coal, oil, and sulphur are, each of them, indications that at one time in the history of this district volcanic forces were active. The action of air, rain, and running water have all but destroyed the outward and visible signs of the old volcanoes; but there can be no doubt that the whole of this Appalachian system is the result of fiery or igneous action. Where this is so, the outlines of the hills are usually bold, and often assume fantastic shapes.

8. Where the hills have softer outlines and rounded summits, as they have further north, in Canada, we may be sure the forces which moulded them were aqueous, or, in some way, due to the action of water in one or other of its forms.

9. Three-fourths of the oil of commerce comes from America. The **oil "rushes"** of Pennsylvania, Ohio, and Virginia rivalled the gold rushes of Australia and California. Huge fortunes were made almost between night and morning. A farmer who saw a little oily scum floating in his wells or horse-ponds became a millionaire in a week. Every one who could leave home rushed to Oil Creek Valley; and, in a short time, the whole district became the scene of incredible activity.

10. In 1819, whilst boring for salt, the miners came across petroleum in great quantities. But, long before that date, the Indians used to collect it, and sell it as a remedy for bruises, sprains, and wounds. Traces of old wells are even found in the Mississippi Valley, evidently the work of much older races than the redskins of to-day.

11. A small river in Pennsylvania was named Oil Creek because patches of oil were always floating on its waters. The people on the banks were in the habit of laying rugs and blankets on the pools and ditches, and wringing out the oil thus collected.

12. It struck Colonel Drake, in 1858, that, if oil came to the surface, it must spring from some saturated earth below, or even from an internal reservoir, just as water does. He began sinking a shaft, and although he was laughed at by his friends, he persevered for nearly a year.

13. In August, 1859, at a depth of eighty feet, he struck oil, and he was soon pumping one thousand gallons a day from his well. The news spread, and caused intense excitement. Soon, the whole valley was filled with tall derricks, erected for boring wells. Towns sprang up like mushrooms, and the valley was parcelled out in lots and holdings, which were bought and sold, again and again.

14. As an example of the rapid growth of some of the towns, Pithole City may be given. In 1865, not a house stood anywhere near its site. In four months it had a population of five thousand men, and boasted of forty taverns, a theatre, a bank, a newspaper, and several churches. At that time it had neither magistrates nor police, and yet its citizens kept good order.

15. The petroleum trade is now one of the staple industries of Philadelphia and Baltimore, and four million pounds' worth of oil are pumped every year. It is six times cheaper now than it was in 1859, but the production has steadily increased, till, at the present time, oil of the value of four millions sterling is raised in the United States.

ALLEGHANY MOUNTAINS.

9.

1. Leaving the coal and oil of the Appalachian Mountains, let us devote a chapter to the various parts which make up the system. The best known range is that of the **Alleghanies** of Pennsylvania. They are not more than three thousand feet high in the north; but it is amongst the recesses of these hills that we find the oil, coal, and iron beds, which have helped to make the American people almost independent of Europe in the matter of fuel and manufactures.

2. The Alleghanies run south into Virginia and North Carolina, taking new names—the **Blue Ridge** and the **Black Mountains.** They are now true mountains, and one of the peaks—the Black Dome—is over six thousand feet high.

3. The **Cumberland Mountains** of Kentucky form part of the Appalachian system, and it is here that we come across one of the "big" things we alluded to some time ago as being the boast of the American. Kentucky has within its borders the largest cave in the world.

4. It is well named the **Mammoth Cave,** for its windings have been traced for two hundred and seventeen miles. Its whole extent has not yet been explored, but it is quite a subterranean world. Galleries and passages without number cross and re-cross each other in all directions, down to an immense depth.

A SCENE IN THE MAMMOTH CAVE.

5. It has a system of lakes and rivers, inhabited by strange-looking, blind fish. Huge white rats and loathsome lizards wander gloomily about in this world of darkness, whilst a kind of yellow cricket crawls like a frog, guiding its course by means of enormous feelers.

6. Neither the heat of summer nor the cold of winter penetrates more than a few yards into the Mammoth Cave. The temperature remains the same all the year round. The cave was evidently used, long ago, as a retreat by savage tribes, for skeletons of men of an unknown race have been found buried beneath its limestone floor.

7. The **White Mountains** of New Hampshire, and the Green Mountains of Vermont, are also parts of the Appalachian system. Here the citizens of New York and Boston resort during the summer months. They are the Snowdons and Helvellyns of America.

8 We must not forget to mention the **Catskills**, overlooking the Hudson River—the Rhine of America. It was amongst these hills that Washington Irving makes Rip Van Winkle wander when driven from home by his wife's sharp tongue.

9 The story of the village "ne'er-do-well," who in his aimless wanderings came across Hudson's ghostly crew holding their annual revels in a hollow of the Catskills; how he helped them to roll their magic schnapps up-hill; how he played

nine-pins with goblin comrades, and afterwards drank the magic draught which sent him to sleep for twenty years; how he awoke to find his clothes reduced to rags, his gun a mass of rust, himself a white-haired human wreck, who had slept on into another generation which knew him not, is one of the best-told tales in the whole range of modern literature.

10.—THE ROCKY MOUNTAINS.

1. Stretching from Mexico into Canada we have a complete mountain system, which embraces a series of parallel ranges, separated from each other by wide valleys, high plateaux, and barren deserts. This system is known by quite a variety of names; but, if the map is carefully studied, we shall be able to retain its four great divisions somewhat distinctly in our minds.

2. First, we have that great range, known as the **Rocky Mountains,** which embraces all the mountainous districts of Idaho, Montana, Wyoming, Colorado, and New Mexico. This range stretches northward into Canada, and southward into Mexico. It can be traced through Central America into the Andes of South America. It constitutes part of the great backbone of the New World, which is ten thousand miles in length, and forms the longest mountain range in the world.

3. Second, we have a great plateau region drained

by the Colorado and its tributaries. This region will be more fully described later on.

4. Next, we have, extending over Utah and Nevada, the **Great Basin,** with a complex system of mountain ranges, sandy deserts, salt lakes, and inland rivers.

5. And, lastly, we have the **Pacific Coast Ranges,** which, as their name implies, run along the western shore of the United States in a series of parallel ridges. They are known by various names, such as the Sierra Nevada, Cascade, and Coast Ranges.

6. The **Rocky Mountains** form the great watershed between the Pacific and Gulf rivers. The head waters of the Missouri, Arkansas, and Red River are situated amongst its spurs and recesses. East of the Rockies we have a succession of plains and prairies, with only an occasional "bluff" or hill, stretching right away to the Appalachians.

7. The Rockies are, in places, five hundred miles wide; whilst, for height and picturesque effects, they rival the well-known Alps of Switzerland. In the north-east of Wyoming lies a peculiar region. It may be called the apex of the United States. From it, rivers flow in all directions—north, south, east, and west. Here may be seen the lodges of the red man. It is the home and breeding-place

of the wapiti (noblest of deer) and the moose (the clumsiest of that species.)

8. Here also roams the grizzly, the most terrible of the bear kind. Fortunately, he cannot climb, or tourists would fight shy of this district. It is here that the Americans have set apart four thousand square miles of land for ever as a National Park. It lies in the very centre of the continent, and is on what the Earl of Dunraven has called the Great Divide. Volumes might be written about this park; we can only devote a couple of chapters to it.

11.—THE YELLOWSTONE NATIONAL PARK.

1. Nowhere, perhaps, in the world is so much natural beauty collected in one spot as in the **Yellowstone National Park.** "The whole district seems to have been set aside for the exhibition of the action of volcanic forces."

2. Before 1864, it was a completely unknown country. Trappers, hunters, and Indians told strange stories of springs which threw up boiling water, of lakes eight thousand feet above the level of the sea, and trees almost touching the clouds. In 1870, a party was organised to test the truth of these stories; and, two years later, the district was thoroughly explored by order of the United States Government.

3. The Park was found to lie at an elevation of

eight thousand feet. This gives it an almost Arctic winter. Even in summer, night-frosts are frequent. The winter begins in September, and snow lies on

MAP OF YELLOWSTONE NATIONAL PARK.

the ground for several months. Farming operations cannot be carried on in such a climate; so, for all

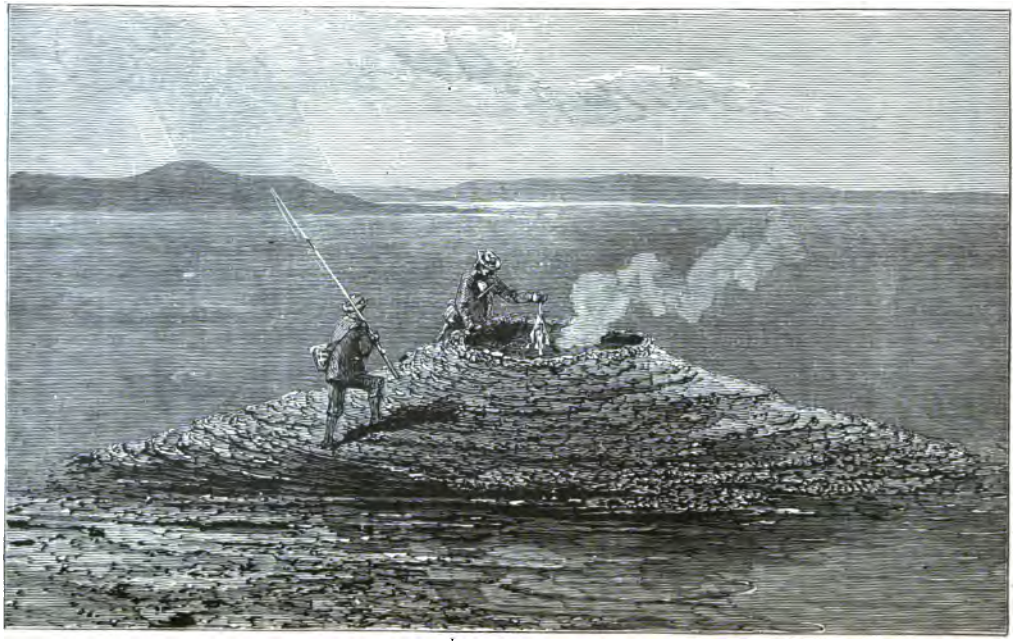
ordinary purposes, the Park is valueless, and likely to remain so.

4. **Hot springs** are found all over this region. They spout up everywhere—among the dense timber, on the plateaux, in river valleys, on mountain slopes and summits, and even in the beds of lakes and rivers. They bring up from below limestone in solution. This is deposited, and has built quite small mountain ranges.

5. These hot springs, or geysers, are of all sizes, from a few inches in diameter to several acres of hot water. They are of all temperatures, from tepid to boiling. Some keep bubbling over continually; others have periodical fits of activity, and throw up columns of water two hundred feet high. Let us describe some of these.

6. "**Old Faithful**" is the name given to one of the finest and most regular of the geysers. Travellers have been known to wait all day in Iceland for a geyser to spout; but "Old Faithful" never disappoints visitors in this way. It is a thoroughly well-conducted geyser, and remains quiet for one hour and three minutes, then it gives a few gentle splutters, and for five minutes throws up a column of hot water one hundred and thirty feet high. Then follow a few puffs of steam, and all is over for another sixty-three minutes.

7. The "**Bee-hive**" is another fine geyser, but it cannot be depended on. When spouting, the



HOT SPRING CONE.

steam shakes the earth around with mighty throbs, and water is thrown to a height of one hundred and ninety-three feet.

8. The "**Minute Man**" is an active little geyser; it spouts every minute for three hours at a stretch; then it rests for about the same length of time.

9. The "**Fish Hot Spring**" is a very convenient arrangement for the anglers of the Yellowstone lake. The spring wells out near the side of the lake; and it is possible, on its flat cone, to fish from the lake, to swing the fish, when caught, into the boiling cauldron, and cook them on the hook.

12.

1. Geysers and hot springs are not the only objects of interest to be seen in this district. Dame Nature gives us a varied programme of lakes, waterfalls, and cañons. Let us say a few words about each.

2. The **Yellowstone River** flows through the whole length of the park, and at one place shoots over a precipice one hundred and twelve feet high. Half-a-mile further on, the river narrows to one hundred feet, and plunges over another precipice three hundred feet high. Speaking of these falls, an American writer says, "We have here a picture of almost unequalled magnificence

THE COLORADO CAÑONS.

and grandeur. It is a scene of which one never tires, and in the description of which language fails."[1]

3. The river now runs for twenty miles in the **Grand Cañon.** These cañons are peculiar to North America. They are deep gorges, with vertical sides, and appear to be sawn out of the plateaux by the action of running water. To get them at their best, we require a nearly rainless table-land of soft rocks, and a river, or torrent, fed by melting snow or mountain rains. Both of these conditions prevail in the great plateau drained by the Colorado River.

4. One of the Yellowstone lakes lies at an elevation of eight thousand feet, and is, with four exceptions, the highest lake in the world.

5. Another feature of the Yellowstone Park is the number of stone trees one sees lying scattered over the surface, or jutting out from the faces of the cliffs. We have already pointed out that the whole region is volcanic. Streams of lava and showers of ashes have, at one time or other, covered over the growing timber. Bit by bit the embedded trees changed from wood to stone.

6. Then came running water and washed out the softer rock, leaving the stone trees exposed to tell the story of their sudden destruction. As the whole of the valleys are heavily timbered, and, as

[1] Dr. Peale, Geological Survey.

Nature often repeats herself, the same thing may happen again, and give the geologists of the future something to wonder at.

7. Near the source of the Yellowstone River is to be found the head waters of the noble Columbian River, here known as the **Snake River.** It also flows through terrific gorges; and, at one place, has a vertical fall of one hundred and ninety feet. The river is seven hundred feet wide; and, when swollen by the rapidly melting snows in the springtime, the fall is not much inferior to Niagara in volume.

8. The chief drawback to the National Park is its distance from the great towns of the States. Only the wealthy can afford to visit it. The traveller, after leaving Utah, must be prepared for a tedious coach journey of three days and nights. He must buy or hire animals to carry him and his food.

9. He must be able to shoot, or he will starve; and he must be something of a mountaineer, to find his way about among the crags and precipices; and something of a forester, to pick his route amongst all the trees which lie piled about. "Apparently, all the timber which has lived and died there has been heaped up like huge hay-stacks to oppose his progress."

13.—THE COLORADO PLATEAU.

1. This is the name given to all that peculiar region drained by the Colorado River. It is hemmed in on all sides, except towards the south, by high mountains, and consists of high and dry tablelands, intersected by deep gorges and cañons.

2. The country is mainly arid and sterile, with long gentle slopes; but, often, the changes of level are sudden, one plateau leading to another by abrupt precipitous steps. For miles and miles nothing is visible but rock.

3. Major Powell writes, "The landscape everywhere is of rock. Cliffs of rock, tables of rock, plateaux of rock, terraces of rock, crags of rock—ten thousand strangely carved forms. Rocks everywhere, and no vegetation, no soil, no land. When speaking of these rocks, we must not conceive of piles, or boulders, or heaps of fragments, but a whole land of naked rock with giant forms carved upon it."

4. These rocks are variously coloured—some red and grey, others chocolate. The climate is too dry to support a growth of moss or lichens, so the rocks are bare, and often highly polished.

5. Some parts of the tableland are covered with a thin sand, which supports a few straggling sage bushes and weird-looking cacti.

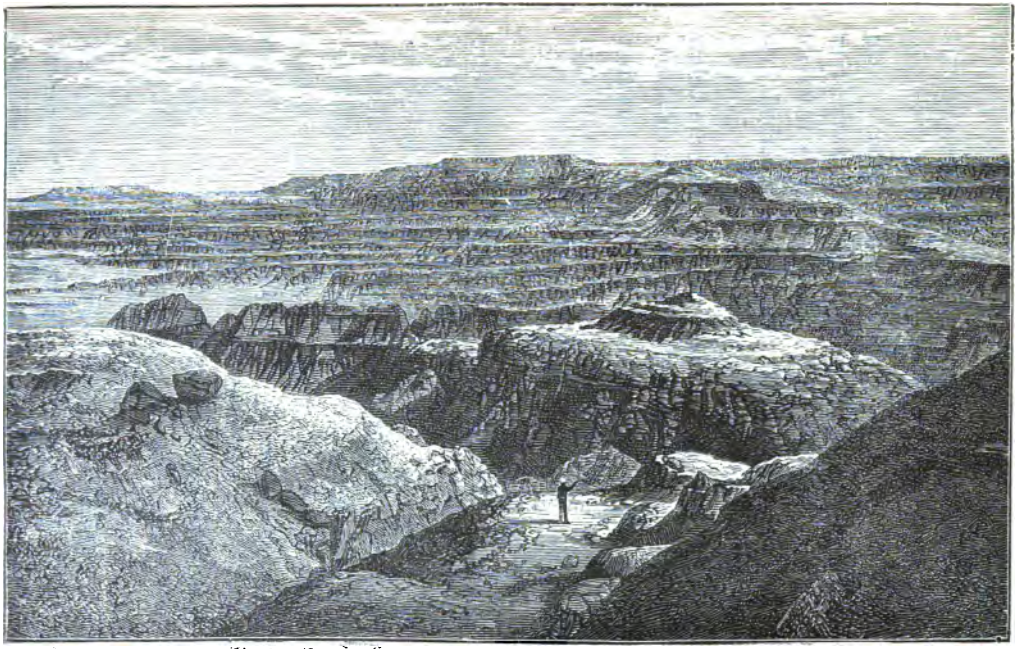
6. This is eminently a region of cañons. Every watercourse, whether a rolling river, or a driblet of

a few gallons, runs in a deep cañon, with precipitous walls often of enormous height. Sometimes these cañons are so numerous as to cut the plateau into shreds, leaving a mere skeleton of a country.

7. Many of the cañons are quite dry, having been carved out by a torrent, which only lasted for a few weeks in the spring. Looking at them, it seems impossible that running water could have all this cutting and carving power. We must remember, however, that it is not by any means clear water which does this work, but a torrent loaded with sand, gravel, and even fair-sized stones.

8. These are the tools which Nature has used to produce this curious fret-work we have in the Colorado Basin. Whole belts of country, miles in width, have thus been swept away, whilst gaps and fissures, so deep that the eye can barely penetrate them, are separated by walls whose thickness one can almost span.

9. In 1869, Major Powell explored in boats the **Great Colorado Cañon** for one thousand miles. Throughout the whole of that distance, the river ran in fissures varying from one thousand feet to a mile in vertical height. Sometimes clouds played around the top of the cañon, filling the gorge with gloom. Often the boats shot down rapids with terrific speed, or glided gently over dark green pools of tremendous depth.



BAD LANDS.

14.—THE GREAT BASIN.

1. West of the Great Plateau we have been describing, and east of the Sierra Nevada range, lies another peculiar region. The rivers here have no outlet to the ocean. They are either absorbed into a thirsty soil, or flow into salt lakes.

2. Some portions of this **Great Basin** are below the level of the sea, whilst other parts have an elevation of ten thousand feet. Men of science tell us that the whole of this great depression was once a huge fresh-water lake, dotted here and there with islands, the mountain ranges of to-day.

3. It is further supposed that the waters were slowly dried up, leaving only the present lakes, which could find no outlet to the sea. These became salt, because evaporation would carry off only the water and leave the saline matters behind. This, then, accounts for the existence of the briny waters of Lake Utah and the Great Salt Lake, which are both situated on the Great Basin.

4. The **Great Salt Lake** has an area of two thousand three hundred and sixty square miles. It is very shallow, averaging no more than twenty feet in depth, and its waters are so strongly impregnated with salt, that a man floats easily on its surface; he may even sleep on its waters, in fine weather, without fear of drowning.

5. A drop of water from this briny lake, falling into the eye, causes the most intense pain, and a mouthful, accidentally swallowed, will bring on a violent cough. Fish, carried down by the river, immediately perish. Not a tree grows upon its shores, or on the adjacent plains; the only vegetation to be seen, far and wide, consists of tufts of *Artemisia*, a plant which delights in soil impregnated with saline matter.

6. The lake is constantly changing its level. Since 1850, it has risen eleven feet, and has almost doubled its area. This seems to show that the climate is becoming moister—a fact probably due to the planting of trees by the settlers. It may be that this lake will regain its former dimensions. High up on the neighbouring hills the old shore line can be distinctly traced nine hundred and seventy feet above its present level.

7. The Great Salt Lake is the Dead Sea of America. Into it falls another Jordan, and, strangely enough, on its shores dwell the Mormons, who claim to be descendants of the Jews, and who call themselves the chosen people of the New World.

8. Within the Great Basin lie two valleys which are below the level of the sea. One of these bears the significant name of the "**Death Valley.**" It lies one hundred and fifty feet below the Pacific, and gets its name from the number of travellers who have perished in attempting to cross it.

9. There is not a drop of water to be found in the valley; a few miserable sage bushes, and, here and there, a solitary cactus—are all that meet the eye. The sun's rays pour down on bare rocks and drifting sands, creating an intense heat, and increasing the thirst of weary travellers.

15.—THE PACIFIC RANGES.

1. The **Pacific Ranges** stretch from **Alaska** to the peninsula of California, and consist of immense parallel ridges of mountains, never far distant from the Pacific Ocean. The two great chains are the Sierra Nevada and the Cascade Range.

2. In the **Cascade Range** are a good many active volcanoes. Mount St. Helen's was in a state of eruption in 1842, and Mount Baker still gives off steam.

3. The highest point, however, is that of **Mount Ranier,** in Washington territory. It is fourteen thousand four hundred and forty-four feet high, and bears on its slopes a glacier ten miles long and five broad. This is, of course, very small compared with Alpine glaciers, but it is the largest which the United States can produce.

4. To possess really fine glaciers a country must have a moist climate and suitable valleys in which the snow may collect. On the Pacific ranges snow evaporates almost as soon as it falls, and in many

cases the slopes are so steep that the snow rolls down in avalanches, and melts in the valleys below the snow-line.

5. A curious thing about the Ranier Glaciers is

MOUNT RANIER, FROM THE COLUMBIA RIVER.

the fact that they are often melted by the burning lava which flows over them.

6. The most interesting mountain of the Nevada Range is **Mount Shasta**, which is nearly as high as Mount Ranier. It is an extinct volcano, and

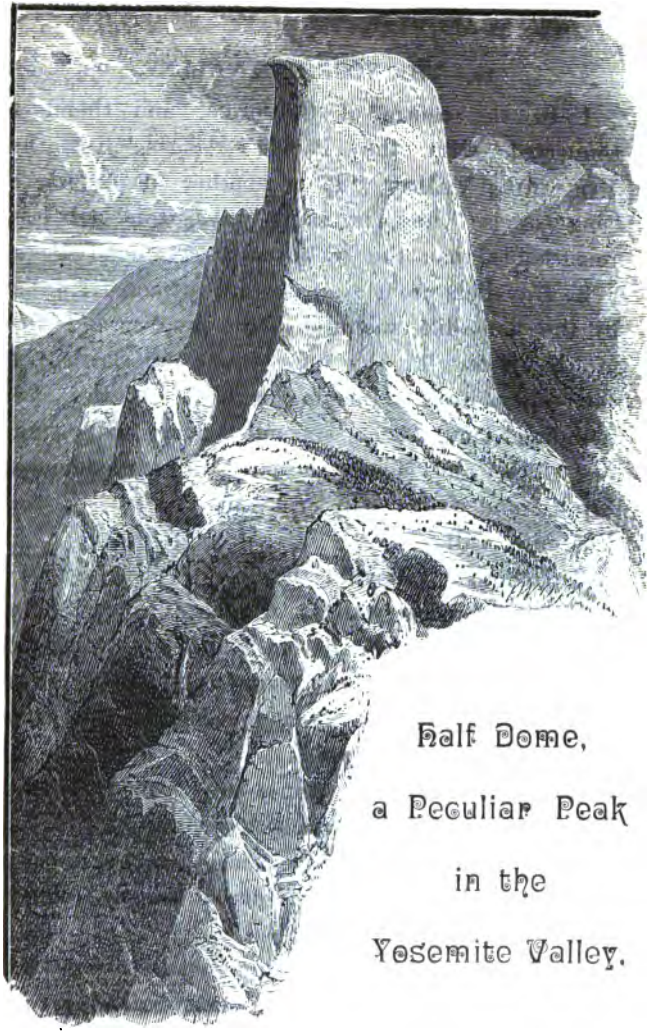
towers in solitary grandeur from amongst hundreds of little volcanic cones lying round its base.

7. From whatever point it may be approached it stands out as one of the finest peaks in the New World. Up to the snow-line it is fringed by dark pine woods, which form a direct contrast to the white snow, or the pale grey and rosy tints of the fields of lava.

8. Like most of the mountains of America, it is easy to climb. There is little of the danger and excitement which gives such an intense interest to the well-known peaks of Europe, and members of the Alpine Club would think the ascent of Shasta poor sport. Yet it was not until 1870 that it succumbed to the mountaineer.

9. In that year it was scaled by an American geologist, who describes the summit as being crowned by a crater bowl a mile in diameter and one thousand feet deep. Hot springs full of sulphurous water abound, and the earth in many places is hot to the touch.

10. Mountaineers, in the Rocky Mountains and Nevadas, seem to be exempt from many of the troubles which are incidental to mountain ascents in the Old World. Excessive fatigue, faintness, and bleeding at mouth, nose, and ears, are all unknown to those who venture to climb the ranges we have been describing.



Half Dome,
a Peculiar Peak
in the
Yosemite Valley.

16.—THE YOSEMITE VALLEY.

1. In the centre of California, and therefore connected with the Pacific Ranges, lies the **Yosemite Valley.** It is another of America's "big things;" and, in many ways, it is not less remarkable than the Yellowstone National Park.

2. Travellers from all parts are attracted thither by the dome-like mountains, the number and size of the waterfalls, the huge trees, and, lastly, by the valley itself. Imagine a break in the surrounding land about six miles long, half-a-mile in width, and nearly a mile in perpendicular depth, and you will get some idea of the Yosemite Valley.

3. No other valley in the world is enclosed by such high vertical walls. A perpendicular height of a mile is one of the most difficult things to realise, and it is when gazing at it, either from above or below, that a man recognises his own littleness in the universe.

4. In other valleys, slopes are formed by the constant dropping of particles from the rocky sides. But in the Yosemite Valley, such is the dryness of the air that no *talus*[1] forms at the base of the cliffs.

5. Here waterfalls are so numerous that many are left unvisited Of such great beauty are they, that

[1] Heap of rocky fragments.

any one of them would be a fortune for a Swiss or Norwegian hotel proprietor. We can only describe one or two.

BRIDAL VEIL FALL.

6. The Merced River enters the valley in quite a number of tributaries. One of these plunges

RED WOOD TREES, CALIFORNIA.

two thousand six hundred feet into the valley below, forming the **Yosemite Fall,** which is probably the highest in the world.

7. Another is the **Bridal Veil Fall,** so called

because its waters are swayed hither and thither by the wind, and often quite dissolved in spray. This falls a sheer height of six hundred and thirty feet.

8. In this valley, and in some seven other places not far away, may be seen the **Giant trees of California.** It is a curious fact that these trees seem to be limited to districts lying about six thousand feet above the sea level, and all the eight groves are situated between 36° and 38° north latitude.

9. The **Calaveras Grove** is the best known, and contains about one hundred trees of largest size. Thirty-one of these have been measured, and the highest is three hundred and twenty-five feet. Another, called the **Mother of the Forest,** is twenty feet in diameter. Unfortunately, the largest has been cut down, whilst another has ceased growing, all the bark within reach of tourists having been chipped off.

17.—GOLD.

1. We must not leave the Pacific Ranges without saying something of their mineral wealth. Gold has done for California and Nevada what oil did for the Alleghany district. It brought people in large numbers, and concentrated them in certain centres, from which they gradually dispersed.

2. Hundreds who were, at first, attracted by gold, eventually settled as farmers, graziers, and fruit growers. Whilst hunting for gold, they saw the natural resources of the country; how it could produce every European fruit to perfection; how its rivers teemed with salmon and other fish; how its timber was the largest of its kind, and its climate one of the finest in the world; and, so, hundreds settled who had no intention of doing so at first.

3. Gold is found distributed in two ways. First, lying loose in grains and nuggets in the sands and gravels of river beds, or in crevices where it has been washed down along with other *debris* from mountain sides. Secondly, embedded among solid veins of a hard rock resembling quartz.

4. Anyone who has pluck and energy may do well, if he is lucky enough to find gold lying as at first described. No capital is required. A sharp eye for the yellow grains; ready recognition of likely spots; a spade and a rocker, are all that a man requires.

5. The **Rocker** is like a child's cradle, lined with sheet-iron, in which small holes are punched. The clay, sand, and dirt containing the golden particles are thrown into the rocker, whilst the man vigorously rocks the cradle with one hand and pours in water with the other. This rocking separates the gold from its casing of dirt, which flows out as mud, leaving the heavier metal behind.

6. Very soon, all the surface deposits were attacked, and, apparently, worked out. Then came the patient Chinaman, who worked at the white man's left-off heaps, and made humble fortunes, whilst his whiter brother attacked the gold veins lying in the massive quartz rocks. This required capital and combined effort.

7. Mills had to be erected for crushing the hard rocks. Pumps and long rows of pipes had to be laid down to get a water supply. Then, tons of quicksilver had to be obtained, and all of this before a single ounce of gold could be procured.

8. The quartz rock had to be broken up by heavy metal stampers, which came down with a twist, so as to grind the fragments small. The dust was washed away with streams of water. Then mercury was used to attract the particles of gold dust. The *amalgam* thus formed was heated, until the mercury was given off, and the gold left behind.

9. All this required much capital, and gold-mining became a steady industry. There was no longer that glorious uncertainty which has such a charm for many men. Gold-getting was robbed of much of its romance. It became a matter of simple drudgery and daily wages. The bolder spirits still ranged the hills in search of likely spots, living a hard and adventurous life, whilst others took to farming or stock-raising.

18.—A GOLD RUSH.

1. In 1849, the eyes of the world were turned towards California. In six months, it was calculated that ninety thousand persons found their way to the Gold Diggings in the "Far West." Perhaps the world had never seen such an extensive immigration. From Mexico, Peru, Chili, the Sandwich Islands, the settled States on the east, and from across the Atlantic, a motley crew poured into the New Eldorado, day after day.

2. How they suffered can now be only faintly imagined. The prairies and deserts of the Great Basin are yet strewn with the skeletons of man and beast who perished in that mad race for wealth. It has been estimated that twenty thousand died within six months of their arrival, killed by the hardships they endured in reaching the field of their labours.

3. Fields were left half-planted, houses half-built. Not a man would serve another, in any capacity, when prospects of wealth were thus suddenly opened out to him. Mechanics, merchants, professional men, with vagabonds and rascals of the worst type, all mingled in the mad rush for gold.

4. The soldiers of the States deserted by hundreds; and officers, after vainly trying to stem the current of desertion, threw up their commissions, and trudged over the deserts, side by side, with the humblest privates. The sons of gentlemen, well educated and

gently nurtured, roughed it in company with the outcasts of Eastern seaports. The gold fever touched every class; and, for the time being, Jack was as good as his master.

5. Every slope of the Sierra Nevada was covered with explorers. Every gulch, hollow, or ravine, likely to hold a speck of gold, was carefully gone over. Towns sprang into existence in an incredibly short space of time. A month was sufficent to lay out streets, run up houses, whisky saloons, theatres, and even newspaper offices.

6. Money was scarce, but gold dust was common. It became the legal currency for the time being. Loaves of bread, cabbages, and potatoes were sold for fabulous sums. When no scales were at hand to weigh out the precious metal, a spoon was asked for, and gold dust was measured out by the spoonful. Often the quantity was guessed at. Why waste time in measuring, when all were rich, and the whole community was a gold-dust aristocracy?

7. Every one carried a knife or a six-shooter, and he who could handle his blade the quickest, or shoot the straightest, became the ruler of the camp. Murders were things of every-day occurrence, and violence of all kinds became exceedingly common. Every one was too busy getting rich to pay much attention to these things.

8. By-and-by, things began to settle a little. The more sober spirits took measures to protect

themselves. Vigilance Committees were formed. These met in secret, and decided who were to be weeded out. Regular battles were fought between the vigilants and the roughs. Scores of the latter were killed; others were hanged after a form of trial; and the rest either mended their ways or fled from the country.

9. These scenes were repeated again and again, after every great rush. Every mining village went through a period of tribulation before order could be restored. Happily, these sudden migrations are less frequent than of yore, for the production of gold in California and Nevada is steadily decreasing year by year.

19.—PLAINS AND PRAIRIES.

1. Between the Alleghanies and the Rocky Mountains lie the **Prairies** of America. These boundless plains have always had a peculiar fascination for the average school-boy. The scene of many novels was laid there. Fenimore Cooper made many of his characters wander over this billowy surface. Here Leather Stocking shot buffalo, and stalked the deer.

2. Except in the novels of Mayne Reid and Cooper, these prairies will soon have ceased to exist. The fertile spots are being rapidly snapped up by farmers. The whole country has been surveyed, and mapped out into townships of about thirty-six

square miles. These are again subdivided into smaller plots of a square mile each.

3. As one can see by looking at the map of the States, the Americans have a passion for straight lines. Their towns are built in rectangles, and the streets are laid out in straight lines. The sides of their fields are accurately set, so as to be in a line with the cardinal points.

4. A French writer says—"The purchasers of small or large squares never allow themselves to deviate from the straight line. As true geometricians, they construct their roads, build their cabins, dig their ponds, and sow their turnips in the direction of the meridian or the equator. Thus the prairies, once so beautiful, with their gently undulating contour and their misty distances, now bear a strong resemblance to an immense chess-board."

5. What are these prairie-scenes like? Many of them are stretches of perfectly flat land. This especially applies to those south of Lake Michigan. Geologists tell us that, at one time, the waters of this lake covered much of what is now dry land in the States of Illinois and Wisconsin.

6. In places, the land undulates like the billows of the ocean; whilst, here and there, clumps of trees stand out like islets in the sea. These clumps are often so numerous as to form quite an archipelago. We do not yet know what law governs the distribu-

tion of these trees; but, after miles of rolling prairie, we suddenly come across walls of trunks, through which the light can scarcely penetrate.

7. This contrast between grassy plain and almost impenetrable forest is one of the most prominent features of the landscape of the New World. It has been supposed that nearly all the fertile prairies were once forest land, and that fires, either purposely or accidentally kindled, reduced whole square miles of trees to ashes.

8. Even if the grass escapes the fire for many years, young trees spring up by hundreds. It is probable that before the Indians settled in the land, the whole Mississippi Basin was one dense forest.

9. With what are the prairies covered? Mostly with coarse buffalo grass, which will grow where English clovers and lawn grasses would perish. It is a peculiar fact, that when the natural prairie grass-land is once broken up by the plough, it cannot again be re-set by that species of grass. It rarely seeds, and does not spread from the roots.

20.—PRAIRIE DWELLERS.

1. The animal mostly seen on these grassy plains is the **prairie dog.** It is a curious creature, its very name being a misnomer. It is not a dog at all, but is really the rabbit of the New World. It is a little larger than a squirrel, and somewhat resembles that animal in colour.

2. Like our rabbits, they burrow underground, a little hump on the surface showing where their homes are. This hillock serves another purpose. Sentinels are told off to guard the community; and, on these mounds may be seen the guardians of the prairie squatters.

3. Like the beaver and the rabbit, these animals are gregarious, and live together in colonies which often cover square miles of country. They are shy little fellows, and dive at once into holes on the appearance of a stranger, first giving vent to a series of piping barks. This barking at strangers led the early settlers to think that the little creatures were dogs.

4. The prairie-dog village has two frequent visitors—the rattle-snake and a small species of owl. Both are unwelcome; for, whilst the snake strikes down the older "dogs," the owl plays havoc with their helpless young.

5. It seems to be a rule in nature that size is no protection to an animal, for here the lowly burrower lives on, whilst the lordly **buffalo** is all but extinct, a few half-tamed herds being all that are left of these once mighty denizens of the plains.

6. Wherever the prairie has been untouched by the plough, we may yet come across the tracks of these animals. They migrated from place to place in mighty herds, leaving behind immense furrows,

COWBOYS.

which only years of ploughing can obliterate. What these herds were like, and how they were hunted, can only be gleaned from travellers' tales.

7. We are sure that their unwieldy bodies blackened the plains for miles. An emigrant train has been delayed for hours to let the galloping herds go past; and even the locomotive has whistled in vain to clear the rails. A buffalo herd on the stampede could only be turned by a bluff or a forest, and only stopped by running water.

8. The destruction of the buffalo dates from the opening of the Kansas Pacific Railway. Every train disgorged loads of sportsmen armed with repeating rifles. It was only necessary to keep to the leeward of the herd, and hundreds might be killed before the animals took fright and stampeded. Even then, the chase could be kept up on horseback, and stragglers cut off until the plains were dotted with carcasses.

9. All this is now a thing of the past. Two and a-half millions of animals were killed annually. Looking back, this seems a frightful waste of life, for only the hides were of the slightest use. Vast herds of shorthorns have now taken the place of the buffalo. But it almost seems as if the spirits of these butchered animals yet haunt the plains, for these hedgeless prairies have somehow or other imbued the docile ox of Hereford and Durham with some of the qualities of their wilder brethren.

10. The cowboys of the West have a somewhat rough time of it. The chase on horseback of a drove of Texas cattle is admittedly far more dangerous than was a buffalo hunt in the olden days; and when branding-time comes on, and the cattle are maddened by the pain of the branding-iron, many a cowboy goes down for ever before the charge of the infuriated animals.

21.—INDIANS.

1. Indians and buffaloes seem to be passing away together. Certain it is, that the rapid disappearance of the buffalo has affected the spirits, if not the lives, of their dusky enemies. The buffalo was to

the Indian what the seal is to the Eskimo, the reindeer to the Lapp, or the camel to the Arab. It supplied him with food, clothing, shelter, and even sport and amusement.

2. An old Indian chief could never understand why the white man came to America, until he was told there were no buffaloes in England. That fact seemed to him to account for everything. A land without buffaloes must be but a poor place to live in! So thought the poor Indian, whose heaven is a rolling prairie, and a feast on buffalo steak the highest form of enjoyment.

3. It is a sad fact that the white and red man cannot live together. Wherever they come into close contact, the Indian seems to get the worst of it. He is a hunter by instinct. He will track a deer for days together. Give him a rifle, and he will lie in ambush for hours on the chance of bringing home a wild turkey; but give him a patch to weed, or some maize to hoe, and his noble soul revolts. His dignity is wounded—you have touched his pride—you have asked him to do something useful—and that is woman's work! So thinks the dusky savage.

4. It is a curious fact that the white man's diseases are readily caught by the Indian. Small-pox was unknown until introduced by the settlers. Whole tribes since then have been carried off by this dreadful plague. Whisky, however, is res-

ponsible for as many deaths as smallpox. A dose that would only make a white man cheerful will send an Indian raving mad. It is now considered illegal to supply "fire-water," as it is called, to the redskins.

5. The traveller usually meets his first Indians round the Falls of Niagara, or at the railway stations of the Far West. If he has read Fenimore Cooper and Mayne Reid he will be terribly disappointed, for the noble savage is neither dignified nor picturesque. He has neither mocassins nor war paint, feathers nor wampum.

6. His feet are shod in cheap boots from a New York store, he wears trousers, and, worse than all, a stove-pipe hat. His squaw sells knicknacks to those who collect such things, whilst he himself is content to loaf round or smoke bad tobacco by the hour together.

7. There are some who maintain that the Indian is bound to die out. He cannot be reclaimed. Descended from hereditary hunters, he cannot exist without the beaver, moose, elk, and buffalo. Indian boys, carefully trained in the schools of the white man, make off to the woods whenever an opportunity occurs. All the lessons of civilisation are forgotten in a moment, should the said boy come into contact with any vagrant members of his tribe.

8. This again is all denied by others. They say the Indian can be taught to plough, sow, and reap. His

numbers, say some, are not only not dying out, but actually increasing. He learns readily in the schools: he easily picks up the lore of the white man; he imitates his dress, speaks his language, and has considerable personal dignity. With all this in his favour he should, say some, become a useful member of society.

22.

1. In the "Far West" it is still possible to meet with the real redskin—the Crows and the Blackfeet, the Sioux and the Comanches. They give the United States authorities endless trouble, for they expect to be clothed and fed at the white man's expense.

2. Perhaps this is only fair, for the buffalo has been killed off, and the scream of the locomotive is scaring away all the feathered game; so the Indian finds it hard to live on the land of his fathers. In winter he comes into the settled parts and begs for blankets, fire-water, and preserved meat.

3. So soon as the spring comes round, he puts on his paint, borrows or steals a gun; and, if any arrears of provisions or clothing are owing, he has a dance and goes off on the war-path. He soon gets what he wants, for the United States Government finds it pays better to bribe the red man than to fight him.

4. Thus there is always some little Indian war

INDIANS ON THE WAR-PATH.

going on—never, perhaps, very serious, but sufficient to give the small army of the Republic something to do. War and hunting are his only occupations. His poor squaw must do all the work connected with housekeeping. She it is who packs and unpacks when the tribe is on the move. She must hew the wood, carry the water, and cook, while her lord and master looks on and smokes.

5. War comes naturally to the Indian. He delights in it. He can endure great fatigue and exposure, and can keep up alongside a horse for days together. He is exceedingly cunning, and to lie in ambush and surprise an enemy is considered the mark of a good warrior. He avoids a pitched battle, and thinks it better to stab in the dark than risk a fight in the daylight. He crawls behind rocks or trees, and will lie like a log for hours, if by so doing he can catch his enemy off his guard.

6. His war-paint is put on to frighten his foes. If he can scare them by his hideous appearance so much the better—he may perhaps shoot them in the back as they are running away. "Having done this," says the Earl of Dunraven, "he and his friends will scalp the body, kick it, dance round it, stamp upon it, abuse it, and have a gay old time generally, and then go home and be afraid of the dead man's ghost."

7. Scalping the victim is peculiar to the savages

INDIAN ATTACK ON A MAIL COACH IN THE OLDEN TIME.

of the New World. It is not, as some suppose, a method of torture, for it is only performed on the dead body. The scalp is carefully preserved, as it forms almost the only passport to fame and honour. The young Indian may be tall and handsome, but if no scalps adorn his girdle no warrior will speak to him, and he may sigh in vain, for no dusky maiden will look his way.

8. He spends much time in decorating his person. His long black hair is carefully plaited, and tied with gay ribbons. His leggings are cut in the latest fashion, and tags and tassels are tacked on wherever they will be seen to greatest advantage. In short, he is a thorough dandy, and, in his way, every bit as particular as the coxcombs of London or Paris.

23.—THE PRE-HISTORIC RACES.

1. The Red Indians were not the earliest inhabitants of North America. Everywhere in the Mississippi Valley we meet with traces of an earlier race, whose history goes back thousands—perhaps millions—of years. They were, evidently, a settled people, who cultivated the land, and, in a small way, knew something of the manufacture of iron and copper.

2. They lived in towns and villages, and, like their white successors, had a liking for mathematical figures. Many of their mounds and

remains took the form of squares, circles, and even octagons; and their earthworks, for defence, were pushed out in long straight lines.

3. They left behind them no written history, but, by piecing together little facts, we now know a good deal about them. We know, for example, that they went to Lake Superior for copper, and took long journeys to Canada and Pennsylvania for oil. They also visited Kentucky in search of lead. We also know that they were eventually driven from the plains by wilder and more warlike races; that they took refuge in the hills and caves, and built watch-towers to guard their fields and homes.

4. For want of a better name they have been called **Mound Builders**; and the same race evidently held the land from Canada to the Gulf of Mexico. Their mounds were most likely burying places; for, when opened, they all contained human bones, vases, and stone implements.

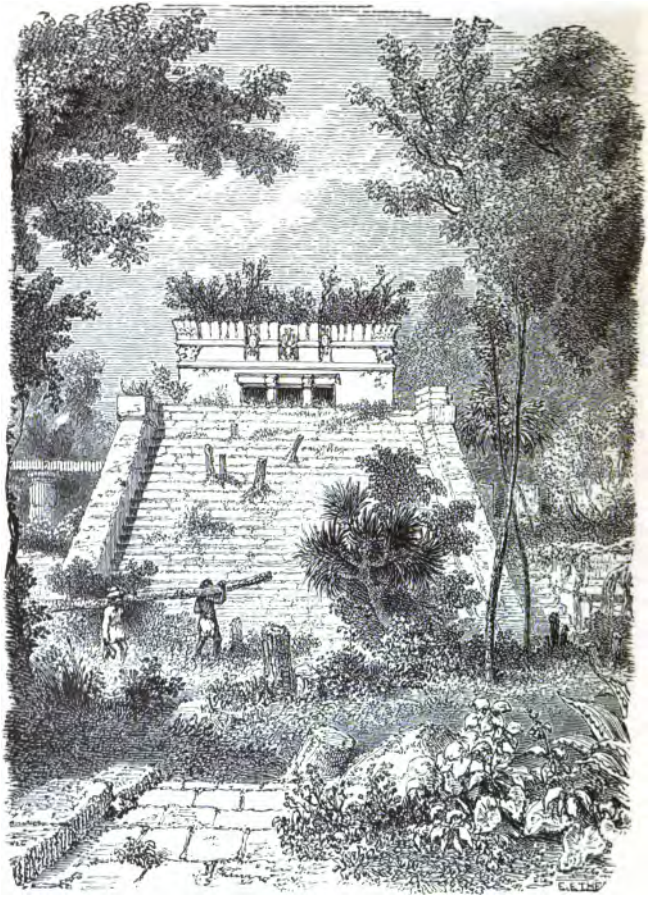
5. Some of the mounds are curiously shaped In the State of Wisconsin they represent rudely the shapes of animals, such as bears, buffaloes, or wolves. One resembles a turtle, and is three hundred feet long; whilst another imitates a hawk with outspread wings. So thickly studded was the site of St. Louis with these earthworks that it is known as the Mound City.

6. Nearer Mexico, we find numerous traces of another people, who were evidently not savages,

but boasted of a fair degree of civilisation. They built houses several stories high. They knew how to hew stones, make bricks, and manufacture mortar. Every town possessed a council-house, which was built with great care, and with some pretension to style and effect.

7. These people not only knew how to make pottery, but must have used enormous quantities of it. Hundreds of square miles are strewn so thickly with broken fragments, in many places, that one may ride for days together, and at every step the horse's hoofs will strike a broken vessel.

8. Here, again, we know that these people were driven from their homes by a ruder and more warlike race; then they, too, took refuge in caves, and in the cañons of Colorado. Here, to be secure, they cut out steps, and constructed ladders to let themselves down the face of the cliff in order to reach their cave dwellings. In almost every cañon may be seen these structures, which look more like swallows' nests than human habitations.



AZTEC RUINS.

24.—THE MISSISSIPPI.

1. We shall, in the next few chapters, say something of the rivers of North America. Here again we are dealing with one of the "big things" so characteristic of this continent. Many a European river would be a slender rivulet, scarcely worth a name, if placed in the basin of the mighty Mississippi, the "Father of Waters."

2. In many ways the Mississippi is a remarkable river. It has a tributary, the Missouri, actually longer than itself. We cannot now tell why the Indians, who gave these names to the rivers, should have called one the Father of Waters, whilst the tributary was nearly two thousand miles longer than the main stream.

3. Talking of names, we find the most curious mixture whilst dealing with the tributaries of the Mississippi. There is a Mud River, a Clear Water River, a Red, White, Black, and Blue River, in addition to a host of others bearing Indian names, which spread themselves over the country like the branches of an oak tree.

4. This spreading out of the tributaries makes the Mississippi perhaps the most useful river on the globe, and gives the people of the States thousands of miles of navigable water. How different in this respect to the Nile, which resembles a palm in its lack of branches.

5. From source to mouth the river is nearly four thousand miles in length, but as the crow flies it is not more than one-fourth of this distance. This shows the river winds a great deal. It would seem that nature dislikes straight lines, at least so far as rivers are concerned; for, given a perfectly level plain, rivers invariably meander over it, winding about in huge curves and loops, as if to prolong the pleasure of a quiet course.

6. In some places these windings are so regular that the Indians used them as a measure for their distances. Occasionally, when flooded, the river would cut across the neck of one of these loops, thus shortening itself by several miles. A humorous American writer says the river is getting shorter every year. He remembers that in his time "cut-offs," as they are termed, have lessened the river's length by some seventy miles.

7. As every flood produces one or more of these "cut-offs," it is only a question of time, and the source and the mouth will be close together, and the people of New Orleans will be able to take a penny tram to St. Louis. Of course, every boy who reads this book will easily see why this can never really happen.

8. The effect of these "cut-offs" was often very curious. The river, in many places, forms the boundary between some of the States; and, often, these "cut-offs" were accomplished in twenty-four

hours, so that between night and morning a plantation was transferred from one State to another. In the old slavery days this was sometimes sufficient to set free the slaves on one bank, whilst, perhaps, on another, the hapless negroes lost their freedom.

9. In olden times the value of a cotton or sugar estate largely depended upon its distance from the river. Unscrupulous landowners have been known to dig a channel in a likely place, and divert a little of the Mississippi water into it, leaving nature to do the rest. The first flood would widen the channel; and, in a day or two, a mile of water was pouring through the new course.

10. The old channel either dried up or left a long series of shallow lakes, showing where the mighty Mississippi had once rolled its waters. Plantations have thus been entirely cut off from the river, and their owners ruined. A thriving town has been known to lose its river frontage, and find itself condemned to obscurity on the banks of a stagnant lagoon, miles away from the nearest steamboat landing.

25.

1. A little to the west of Lake Superior lies a low range of sandstone hills. Embedded amongst these hills, and fringed by dark pines, is Lake Glazier, famous among lakes as the birthplace of the Mississippi. Not far off is another small lake

SCENE ON THE MISSISSIPPI.

out of which flows the St. Louis, which may be regarded as the beginning of the St. Lawrence.

2. After a few days' rain the whole country between these two lakes becomes flooded, and the Indian in his birch canoe may pass from the St. Lawrence to the Mississippi, so nearly are their sources together. More than this, by carrying his canoe for a few yards he may pass into the basin of the Red River, and from thence paddle directly into a river system which has its outlet either in the Arctic Ocean or Hudson's Bay.

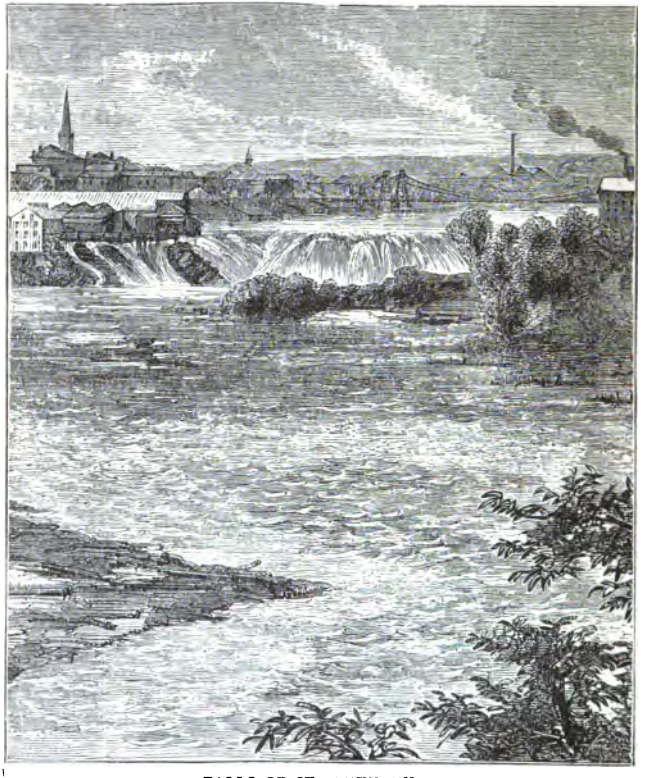
3. The watershed between these three great rivers is not more than a few inches in height, and it very often depends upon the direction of the wind whether a drop of rain falling in this region finds its way into the Atlantic Ocean, the Arctic Ocean, or the Gulf of Mexico.

4. Four hundred miles from Lake Itasca, the Mississippi, now four hundred yards wide, forms a number of cataracts. These are not very high, but they effectually bar the way, as far as traffic is concerned. The upper part of the river passes through picturesque scenery, high wooded bluffs or headlands coming right down to the water's edge.

5. Lower down, the lands are low, a very small rise in the level of the water being sufficient to flood the banks on either side. Almost the whole of this low land is now protected by raised banks

or "levées," as they are called, which stretch for hundreds of miles on either side.

6. At St. Louis the Mississippi and Missouri



FALLS OF ST. ANTHONY.

join, but their waters do not mingle for many miles lower down. Each river has its own colour, and the tawny flood of the main river forms a

striking contrast to the lighter waters of its principal tributary.

7. About its middle course the Mississippi receives two considerable affluents from the west, the Arkansas and the White River. These rivers form a sort of delta, full of channels called 'bayous." These serve an exceedingly useful purpose. When the Mississippi is high, its waters flow back into these bayous, and thus save the land lower down from inundation. When the river falls, the bayous give back the water again, and thus help to regulate the flow and keep the supply constant.

8. A few hundred miles above New Orleans the Red River joins the Mississippi. This river, which is many times larger than our Thames, has connected with it what is known as the **Great Raft.** This is really an immense entanglement of drift-wood, under which the river flows for four hundred miles. In many places a person might travel for miles without having any idea that a considerable river was rolling beneath him. Bushes, and even large trees, have taken root upon this floating mass.

9. Every year sees a mile or two added to this immense arch, for trees are being continually carried down, only to become inextricably jammed against those which preceded them. The Government once took in hand to disperse this gigantic raft. It worked at it for twenty-two years, but gave it up

BASIN OF THE
RIVER MISSISSIPPI.
English Miles
LAKE SUPERIOR
LAKE MICHIGAN
LAKES HURON
LAKE ERIE
ONTARIO
ROCKY MOUNTAINS
Black Hills
St. LOUIS
Little Rock
Natchez
NEW ORLEANS
GULF OF MEXICO
Longitude 25 West of Washington
Longitude 102 West of Greenwich

in despair. The river piled up logs at one end quicker than man could remove them at the other!

10. A fresh channel was dug, and the Great Raft has been abandoned in the marshes which formed the old bed of the river. It will no doubt become a great peat-bed; and may, perhaps, in the distant future, form a long but narrow bed of coal.

25½.

1. The delta of the Mississippi deserves a chapter to itself, for here nature may be caught in the very act of laying down a new coal bed, to say nothing of a new continent which is gradually being formed under the tepid waters of the Gulf of Mexico. Twenty miles away from the shore the muddy waters of the Mississippi are met with. They seem reluctant to mingle with the deep blue salt waters of the ocean.

2. Ships, as they near the coast, break through these sheets of yellowish water, leaving behind a long stretch of transparent sea water. Then, the sailor meets with long, low mud islets on which no plants can take root. All is mud, and so mingled with water that it resembles the sea, whilst the sea is so saturated with mud that it resembles the land.

3. Then the mud gets a little firmer; and, here and there, are scattered the villages of the pilots. These are plank houses, built on rafts, which are

laid on the mud flats, and anchored lest they should be blown away. As the mud gets firmer or the water channels change, these villages are moved nearer the sea.

4. Further up the river, vegetation appears in the shape of reeds and sedges; elsewhere the banks are not yet firm, for the ground trembles if trodden upon; but, presently, a kind of willow takes root, and its fibres bind the loose earth together, and so plays its part in the building up of this new continent.

5. We can calculate the rate at which this gigantic building process is going on. The volume of the Mississippi has been measured. We also know how much mud to the gallon its waters contain. We can thus form a pretty good guess as to the amount of solid earth which is yearly being brought down and deposited around its mouths. From a consideration of all these facts, we suppose that the whole delta of the Mississippi is pushing its way seawards at the rate of one hundred and ten yards per annum.

6. But mud is not the only thing these waters bring down. Trees by the hundred are uprooted at each flood, and borne down to find a final resting-place in the mud of the delta. They soon get covered up, and, what with pressure and age, gradually change from wood to lignite, and from lignite to coal.

7. This decaying vegetation gives rise to another peculiarity to be met with in the Mississippi delta. This is the "mud lump," which for a long time was a puzzle to the geologist, and yet forms the terror of the pilot. These are little islands of mud and clay, which suddenly rise from one to twenty feet above the surface of the water.

MAP OF MISSISSIPPI DELTA.

8. They are really mud volcanoes, and are caused by the pent-up gas from the dead trees finding its way to the surface, and bringing with it as much mud, sand, or clay as forms a new island. As these islands often rise in inconvenient places, a charge of powder is exploded in the crater of the volcano. In this way the mud is scattered, and the channel cleared for navigation.

9. A good map of the Mississippi shows the delta projecting seawards in long tongues of land; and, as the river has five principal mouths, it bears some rough resemblance to the human hand. Others again have compared it to a gigantic flower, which is gradually throwing out enormous petals, each of which will take centuries to unfold.

26.—AGRICULTURE.

1. In our fourth lesson we claimed for the people of the United States that they had, in one bound, taken the very first place as agriculturists. Even gigantic Russia, with its uncounted acres of fertile soil, and its centuries of start in the art of farming, can only claim a very modest place when compared with the young Republic.

2. When the products of the soil are turned into pounds, shillings, and pence, our own little island's produce is valued at less than a third of that of the United States. Even France, probably the most favoured of European countries in the matter of soil and climate, raises only half as much from her soil as does this latest and youngest competitor for agricultural honours.

3. The reason of this prodigious growth in this direction is not far to seek. The Americans had, in the first instance, vast tracts of prairie land ready at once for the plough-share. Watered by magnificent rivers, easily drained, and manured by the ashes

of innumerable prairie fires, they had the first great essential—good land, and plenty of it, with them from the beginning.

4. Necessity, too, made them good farmers—men were scarce and horses dear; they fell back on machinery. Being of an inventive turn of mind, the land was soon flooded with strange-looking agricultural implements, driven by steam. They had steam ploughs, harrows, and cultivators in general

AGRICULTURAL SCENE.

use long before the older countries in Europe thought fit to employ them. Their crops were sown by drills, reaped, stacked, and thrashed by portable steam engines. Such, too, was the nature of the climate that wheat was cut at one end of the field and thrashed at the other, the straw serving as fuel and its ashes as manure.

5. Then, again, the very best intellect of America

was, in some way or other, closely connected with the land. Washington, the first President, never wearied of his farm-yard. When relieved from the cares of office he fell back on his fields, his orchards, and his cattle-sheds. A week before his death he found time to write a letter thirty-two pages long, containing valuable hints as to the management of his various farms.

6. Another president invented a useful form of plough for hillside fields; Adams, Clay, and Webster were all farmers first and statesmen after. No wonder, then, that agriculture was looked upon as an honourable profession, and that the best brains of the country were employed in the cultivation of the soil.

7. **Railways,** too, played their part in the development of the land and its resources. Gigantic companies were formed, and lines of rails spread here, there, and everywhere. A few acres of fertile land, or a promising river-valley was sufficient to tempt the railway speculator. He issued his prospectus, formed his company, ran out his parallel lines of steel in a fashion that would startle an English contractor. He built a wooden shed here and there, which did duty as a station; and then he waited for the population which would surely grow up around his line.

8. In England, population precedes the railway; in America, the reverse is the case; and, as a

consequence, the land has been settled with remarkable rapidity.

9. Almost every American farmer owns the land he tills; he has thus every inducement to work hard and improve his holding. Small farms are on the increase, so that the interest in the land and its cultivation is yearly affecting a greater proportion of the population. It is largely due to all the facts we have mentioned, that the Americans have become, in such a short time, the most successful agricultural nation in the world.

27.

1. The two chief crops upon which the agricultural supremacy of the United States rests are maize, or Indian corn, and cotton. On these she may fairly stake her future, for nowhere in the world can these be grown to better advantage. Twice as much maize is grown as wheat and oats together. This is the real staff of life for horse, cow, and pig.

2. When an American talks of corn he always means Indian corn; but when an Englishman speaks of corn he thinks of wheat. As late as 1860, the Americans imported wheat; now, they produce one-fourth of the world's crop.

3. A field of **maize** is a striking sight, quite equalling in beauty the vineyards of France or the hop gardens of Kent. An American writer says—

"A grand sight is a field of corn (maize) on a hot day. I remember being upon a train in Southern Illinois which had to lie upon a siding for several hours. Nothing but corn was in sight over a great level plain. I wandered among the immense stalks, some at least fourteen feet high. A heavy dew had fallen during the night, and the hot morning sun was now well up in the heavens. Crack after crack resounded like pistol shots. It was the corn bursting its coverings. I imagined I could actually see it grow; I know I *felt* it did so."[1]

4. **Oats** are also largely grown in America, and nothing surprises the Scotchman more when he lands, than to find that the oatmeal porridge he gets in New York is as wholesome and in every way as finely flavoured as that of Edinburgh or Aberdeen.

5. The barley crop of the United States does not yet equal that of the old country; but we must remember that the Americans have not yet acquired that taste for beer which characterises the inhabitants of Britain; so the culture of barley is somewhat neglected. California and New York are the chief barley-growing states.

6. The great southern staple is **cotton.** This plant was introduced in 1621; but it was one hundred and sixty years before any was exported.

[1] Carnegie.

For some reason or other, it did not take kindly to the climate, at first. It was an old world plant and had been cultivated in Egypt from time immemorial. In the early history of America, a duty was placed on cotton goods; this gave a great impetus to the cultivation of cotton, and America soon became the leading source of supply for the world.

7. The largest crop ever grown was raised in 1860, when nearly five million bales were sent into the market. Immediately after, came the great civil war, when the cotton supply entirely ceased for a time, and hundreds of planters were ruined. Since then, the industry has slowly revived, and may now be considered stationary, and likely to remain so, as both India and Egypt are becoming formidable competitors.

8. **Tobacco** growing is extensively carried on in the whole of the Southern States; but Virginia perhaps produces the finest samples of the fragrant weed. Half the tobacco grown is sent abroad; the other half is kept for home consumption.

9. America is the natural home of **potatoes.** They will grow almost in any soil or climate from Georgia to California. Enough are grown to give every man, woman, and child four bushels a-piece. The Americans, however, have such a variety of vegetables to fall back upon, that the potato scarcely occupies such a high place in *their* estimation as it does in ours.

10. The cultivation of the **sugar-cane** is restricted to the extreme south. It demands a hot, damp climate, and negro labour is required to work the plantations. As might be expected, the sugar trade suffered enormously during, and immediately after, the great civil war. Maple sugar is produced principally in New York and Ohio.

11. There is in the States an extraordinary wealth and variety of useful **timber trees.** In the early days whole forests were recklessly cut down or set on fire. Between the Alleghanies and the Mississippi every kind of tree to be found in England will grow, in addition to the cedar, maple, and mahogany. No less than eight million acres of trees are annually required, whilst only ten thousand acres are planted. Already, the wholesale destruction of timber is causing some alarm; and, in certain parts, one day in the year is given up to tree planting.

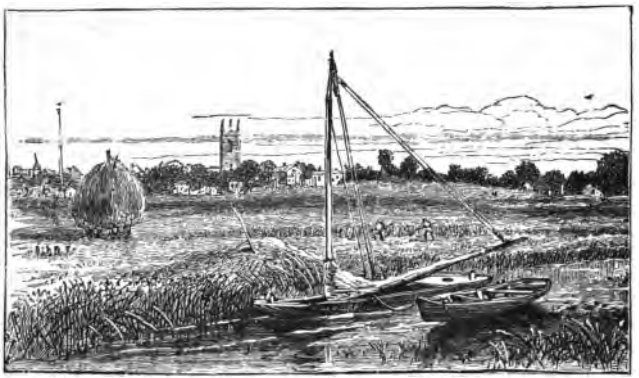
28.

1. **Many chapters might** be written on America's **live stock.** Carnegie says, "Were the live stock upon Uncle Sam's estate ranged five abreast, each animal estimated to occupy a space five feet long, and marched round the world, the head and tail of the procession would overlap." Of these nearly sixty millions are **hogs.** Every farmstead, no matter how humble, can find room for a few of

these animals. All varieties are to be met with, from the choice Essex and Berkshires of the old country to the long-snouted grunter who roots up all before him.

2. The census returns of the States gives on an average, a horse, a cow, four pigs, and three sheep to every man, woman, and child in the country.

3. Some of these animals are the best of their kind. For years the Americans have been in the



AGRICULTURAL SCENE.

habit of paying enormous sums for England's prize animals. The best oxen from Durham and Hereford, and the finest horses of Norfolk, Suffolk, and Lincoln, find their way to America. The Yankee will have the best of everything. His trotting horses hold the record for speed, whilst an American horse (Iroquois) has won the English Derby.

4. In summing up our little account of America's agriculture, we cannot do better than quote from the above-mentioned writer. "The American farms comprise an area of nearly equal to one-fourth of Europe, and larger than four great European countries put together, namely, France, Germany, Austria, and Spain."

5. "The capital invested in agriculture would suffice to buy up the whole of Italy, with its rich olive groves and vineyards, its old historic cities, cathedrals and palaces, its king and aristocracy, its pope and cardinals, and every other feudal appurtenance. Or, if the American farmers were to sell out, they could buy the entire peninsula of Spain, with all its traditions of medieval grandeur, and the flat lands which the Hollanders, at vast cost, have wrested from the sea, and the quaint old towns they have built there."

6. The same writer goes on to show that if American farmers would put away their savings for three years they could buy up Switzerland, with all its lakes and mountains, and use it for a summer play-ground.

7. The cereal crops alone for one year, if built up into a solid mass, would be as high and as wide as St. Paul's Cathedral, and extend for six miles. All the horses in Europe and a million more would be required to remove it, although every horse drew a load of two tons. If this

enormous crop were placed on ordinary railway waggons, it would extend three and a-half times round the globe.

8. As for cattle, it is exceedingly difficult to give any idea as to the exact number exported. A procession of animals placed ten abreast, and extending for fifty miles, would roughly represent the number. What England would do without America to fall back upon, it would be impossible to say. Already, one-third of our population is dependent upon imported food, and the proportion grows greater every year.

9. When we reflect that all this agricultural wealth and experience has been gained during the last fifty years, the Americans have reason to be proud of their magnificent country, and may reasonably congratulate themselves on their own industry and enterprise. Another fifty years of such progress will enable them to supply the whole of Europe with all the food it can require. In the "Far West" lie millions and millions of acres, under sunny skies, watered by magnificent rivers, still awaiting the plough.

29.—TOWNS.

1. In the United States, as in the older settled parts of the world, there is a tendency to gather together in towns rather than in the country. Thirty per cent. of the population is to be found

massed in towns and cities. In years of prosperity the tide of emigration sets in from the country to the town. When times are bad, the town dweller sets out for the country, to gain that living which the town denies him.

CHICAGO IN 1830.

2. America is the land of mushroom towns. Sixty years ago there were not five thousand inhabitants in all that vast territory between Lake Michigan and the Pacific Ocean. Now, it is covered with an agricultural population numbering

some millions, and includes towns like Chicago, St. Paul's, and San Francisco, which may be reckoned among the great cities of the earth.

3. In 1830, **New York** had only a little over two hundred thousand people living in it; now, it

CHICAGO IN 1830.

is second only to London in size, and adds, every ten years, half-a-million to its population. Its actual annual increase equals that of London, whilst the rate per cent. is double that of England's largest town. In forty years, London will have

doubled its present population, New York, in the same time, will have doubled it twice.

4. If the present rate of increase is maintained, 1920 will see these two mighty cities equal in size. If the race for numbers be continued beyond that date, the odds are very much in favour of the younger city, when we consider the immense resources of the country of which it is the commercial capital.

5. If we take the fifty largest cities of America to-day, at least fifteen had no existence sixty years ago. As Carnegie says, "They were not born." Their sites were either the unbroken prairie, or an Indian settlement, with a fort and a few log huts. As an example of phenomenal growth we can cite no better example than **Chicago.**

6. Sixty years ago, it was a small trading station, to which the Indians brought their furs and skins to exchange for powder, shot, and bad whisky. Now, it has a population of over a million, whilst the land on which it was built has increased enormously in value. One writer, in 1846, speaking of this enormous increase, says: "Eight years ago the ground on which the entire city of Chicago stands could have been bought for a sum demanded for a frontage of six feet on one of the streets."

7. Tradition has it, that the man is yet alive

who could have bought the whole place for a pair of old boots. When asked why he didn't do so, he replied—"Ah! stranger, I hadn't the boots." Whether this story be true or not, the fact remains, that this gigantic mushroom town, magnificently situated, with a splendid railway accommodation and unrivalled water communication, bids fair to outstrip both London and New York.

8. Another gigantic mushroom city is **San Francisco.** Favoured by a splendid climate, and a good harbour commanding the great Pacific, it has sprung from a small whaling village to a town of nearly three hundred thousand people. In 1844, there were scarcely fifty people settled in log huts on a barren tract facing the Pacific. A few whalers and traders called now and again to barter food and clothing for tallow, hides, and horns. Now, small plots for building can only be had for sixty thousand pounds apiece.

9. We could go on multiplying these cases of rapid growth, but one other will suffice. Away to the west of Lake Michigan lies the great prairie region of Minnesota, with the twin towns of St. Paul's and Minneapolis. Forty years ago a writer speaks of one of these towns as "St. Paul's in the wilderness." Now the two towns will soon join suburbs, and have a population equal to Manchester and Liverpool combined.

30.

1. Nothing strikes an English visitor more than the brightness and regularity of American towns. We have already noted the Yankee fondness for straight lines. Nowhere is this more conspicuous than in the laying out of the towns. Only the older parts of New York and Boston can boast of those winding or crooked streets, so dear to the lover of the quaint or the antique. This regularity sometimes becomes painfully monotonous; for, in New Jersey, Philadelphia, and Chicago one comes across square miles of blocks and parallelograms, all laid out with mathematical precision.

2. The brightness is due to climate. The air as a rule is clear, and at certain seasons most exhilarating. Distant objects stand out quite clearly with sharp outlines. Every peak and pinnacle of the Catskill can be seen from enormous distances, when it is not actually raining. Perhaps it is this wonderful clearness of the air which encourages the Yankee merchant to advertise his wares in such unlikely places.

3. It is no unusual thing to see the words, "Bovril," or "So and So's Soap," in ten feet characters on a hill-side boulder. In England they would be visible only one day in ten. In America, they would be invisible for about the same time. An English art critic, Oscar Wilde, says, he distinctly read a dentist's door-plate two miles off,

The use of the smokeless coal also helps to render American cities cleaner and brighter than ours. The pall of smoke which constantly hangs over Liverpool, is a matter of continual surprise to Americans entering that port.

4. But if Liverpool disappoints our Yankee friend, rural England delights him. He grumbles at the small size of the London and North-Western carriages; but, once aboard, he passes rapidly through a succession of landscapes, in which the size of the coach and other minor annoyances are forgotten. The hedge-rows, the parks, and ancestral homes of old England, are things which have no counterpart in America.

5. If he has time he visits Chester, Durham, and Stratford-on-Avon, for here he sees bits of the old land, which have not changed since the time of the Pilgrim Fathers. Of course, he naturally condemns the slowness, and what seems to him the lack of energy on the part of the inhabitants, but he cannot enough admire the quaint houses, crooked streets, and old world look of these quiet English towns.

6. Here and there one comes across little things, which show that the love of the home of his ancestors is not entirely dead. The English daisy and sparrow are met with everywhere. So rapidly, indeed, have the sparrows multiplied, that they have become a positive nuisance. The

beautiful Corinthian and Ionic columns in the buildings of New York are protected by wire netting, to prevent these birds disfiguring the capitals; and so vigorously does the daisy grow in its new home, that gardeners are in despair over their spoilt lawns.

7. In the names of the towns, too, we have many a touching tribute to the motherland. When the settler had a new town to christen, what more natural than that he should fall back on the home of his youth for a name. Hence we find Boston, Durham, York, Brighton, Edinburgh, Dundee, Oxford, Plymouth, Coventry, and a host of other towns familiar to English eyes and ears. There is scarcely a town in the old land which has not its namesake in the new.

8. The English traveller might think himself at home again, so familiar are the names of the hotels he meets with. There are Victorias, Clarendons, Westminsters, and Albemarles by the score. True, these temporary homes are a little higher, more sumptuously furnished, and perhaps a shade more uncomfortable than their namesakes in England; but the name will help him to forget that he is three thousand miles from home.

31.—NEW YORK.

1. If we take in the suburbs of New York, it ranks next to London as a busy hive of human beings; almost three millions of people are here gathered at the mouth of a noble and picturesque river, and surrounded by a harbour excelled by none in the world for splendid situation.

2. The town is built upon an island called Manhattan, which is nearly ten miles long and

HELL GATE, THE ENTRANCE TO NEW YORK HARBOUR.

nowhere more than two in breadth. The town of New York proper can thus only grow in one direction, on either side further progress is stopped by the harbour. The older part of the city is clustered in an irregular fashion around the southern point of the island.

3. In the upper part of the town the parallelogram steps in, and any further additions will be built in the usual American style—that is, rectangular avenues all numbered and lettered with

mathematical precision. Only a few of the streets have names, the main arteries, of which there are less than a score, are called First, Second, &c., Avenues, whilst the openings leading from these are known as streets. They are numbered like the avenues, and lead from water to water.

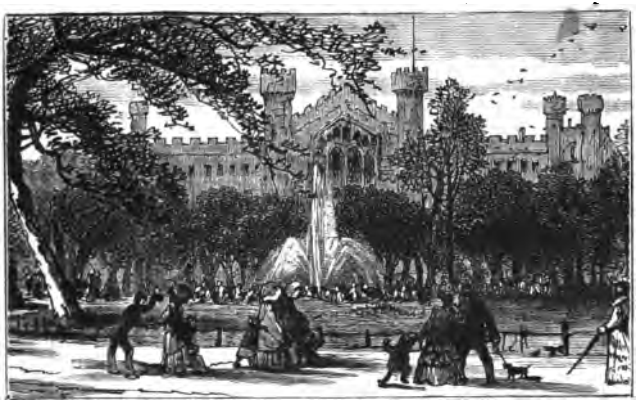
4. As all the world knows, the principal thoroughfare is the **Broadway.** It is at once one of the best and worst streets in the world. It is both broad and narrow, lofty and low, pretentious and mean, at different points. It begins at the southern extremity of the island; and, for two and a-half miles, is perfectly straight. Then, it turns to the left towards the river, joins another famous street called the Bowery, and then, crosses the main avenues in an oblique direction; and, about five miles out, takes itself off into the country.

5. The finest avenue is the Fifth. It is the Belgrave Square, Pall Mall, and Piccadilly of New York, all in one. Here the very cream of New York society has its abiding place. The houses are certainly magnificent, being large and roomy, and have an air of comfortable luxury and wealth which is not surpassed by the finest dwellings in the old world.

6. The city contains, besides a number of handsome private dwellings, some colossal hotels, fitted with baths, lifts, electric lights, and every other convenience that wealth can buy, or taste suggest.

Many Americans have no permanent home, but spend their time in moving from one hotel to another.

7. The suburbs are separated from the city either by the Hudson or an arm of the sea. **New Jersey** and Brooklyn might be cited, with Chicago and St. Louis, as examples of rapid growth. In fifty years **Brooklyn** has increased from twelve



WASHINGTON SQUARE, NEW YORK.

to over eight hundred thousand in population. An enormous bridge, with accommodation for foot passengers, vehicular and railway traffic, spans the arm of the sea which separates New York from Long Island; whilst ferry boats of great size ply, at cheap rates, between the city and its suburbs every few minutes.

8. New York is well provided with open spaces.

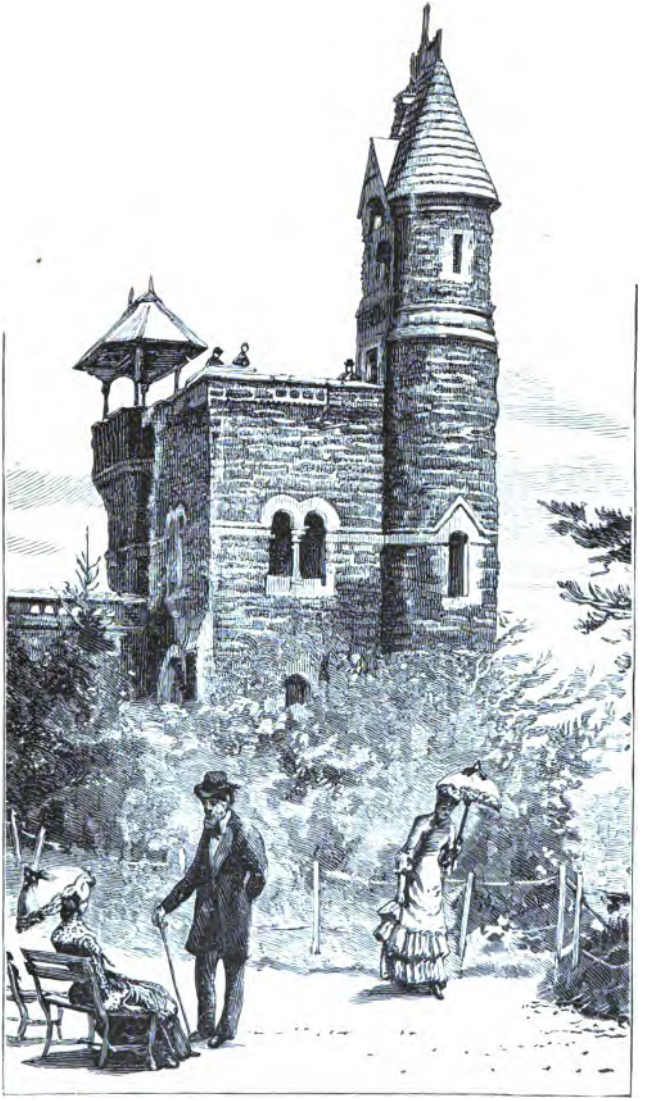
One of these, **Central Park,** is two and a-half miles long by half-a-mile wide. It is undulating and pretty, and what nature has left undone art has supplied. It is the boast and glory of the town. The first question a New Yorker asks is, "Have you seen the Central Park?" and the second, "What do you think of it?"

9. Thirty years ago one of our pleasantest English writers[1] thus poked a little fun at this pardonable weakness of the American people. He said: "It does not do simply to say that it is fine, grand, beautiful, and miraculous. You must declare that it is more fine, more grand, more beautiful, and more miraculous than anything else of the kind elsewhere."

10. When Trollope saw it, he thought it looked all roads, embankments, and ditches. The trees were young, and everything looked raw and far from agreeable to eyes which, for years, had feasted on the trim beauties of Hyde Park or Kensington Gardens.

11. Now, the Central Park is, undoubtedly, one of the finest town enclosures in the world. It is embellished with groves of well-grown trees and shrubbery; whilst ponds, fountains, and statuary are scattered about with a lavish hand. The large lake in the centre of the park is the reservoir from which the town draws its supplies of water.

[1] Anthony Trollope.



THE BELVEDERE, CENTRAL PARK, NEW YORK.

32.—WASHINGTON.

1. We have in the last chapter described the commercial capital of the United States, let us now turn to the political capital. **Washington** was built for a purpose. The site was selected by that great hero of the American people, George Washington, as being likely to supply all the wants of an ideal capital. It was intended to combine in itself a central position, safety from attack, and facilities for commerce.

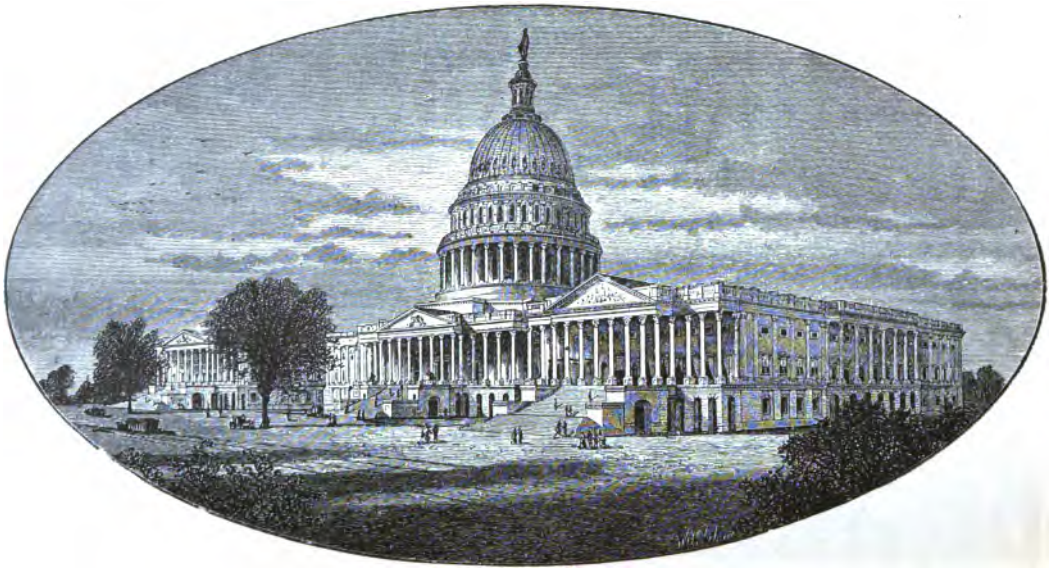
2. Trollope shows that from these three points of view it has been an absolute failure. It is built one hundred miles up the river Potomac. It is therefore not a seaport, and the river seems actually to have dwindled since the site was chosen. Commercially, the town is nothing; the only business carried on is that of supplying the government officials with the necessaries of life.

3. As regards safety and immunity from invasion, it is, curiously enough, the only American city which has been in the hands of an enemy since the people were banded together as a nation. In 1812 it fell into our hands, and we burnt it. Again, on the map it seems to occupy a central position, but only on the map. The main trunk lines of railways really decide this question, and, looked at from this point of view, either St. Louis or Baltimore would have made a better political centre.

4. Washington can never become a great city. It is commerce that decides whether or not a city is to rank as one of the populous places of the earth. London, New York, and Philadelphia have become great in spite of themselves. Without thought, and in a haphazard kind of way, these towns have attracted millions; whilst Washington, carefully planned and designed, must be content with its thousands.

5. The town, however, is laid out on a gigantic scale, and, from a dirty, straggling, and unhealthy village, has become one of the finest and healthiest of American cities. The plan, too, is one of great beauty and symmetry, and the streets are wider than those of the finest towns of Europe, varying in width from seventy to one hundred and sixty feet.

6. In the centre of the town stands the **Capitol**, the Parliament House of the American people. From the Capitol run the four main thoroughfares, radiating exactly in the direction of the cardinal points—these are known as North, South, East, and West Capitol Streets. The other streets running north and south are numbered, starting from the Capitol, 1st Street East, 1st Street West, &c., whilst those running east and west are known as A Street North, A Street South, and so on. Thus, it is perfectly easy to find one's way about, although an entire stranger to the city.



THE CAPITOL, WASHINGTON.

7. Besides these streets, which divide the city into rectangles, there is a system of avenues, which cut the streets at angles of thirty or sixty degrees. These avenues are named after the States of the Union, thus we have Massachusetts Avenue, Pennsylvania Avenue, New Jersey Avenue, &c. At many of the crossings small triangular or circular patches of ground have been railed off and cultivated.

8. It is only fair to state that Anthony Trollope could see no beauty whatever in Washington. He says the town left a distinctly unsatisfactory impression; its regularity looked well on paper, but the actual thing was disappointing. The streets were continuous, but not so the houses. "There will be a house, then a blank; then two houses, then a double blank. After that a hut or two, and then probably an excellent, roomy, handsome family mansion.

9. "I found none who spoke of their city with affection. The men and women of Boston think the sun shines nowhere else. The New Yorker believes in Fifth Avenue with an unswerving faith. Philadelphia is to a Philadelphian the centre of the universe. The same may be said of Chicago, of Buffalo, and of Baltimore. But the same thing cannot be said to any degree of Washington. They who belong to it turn up their noses at it. They feel that they live surrounded by a failure."

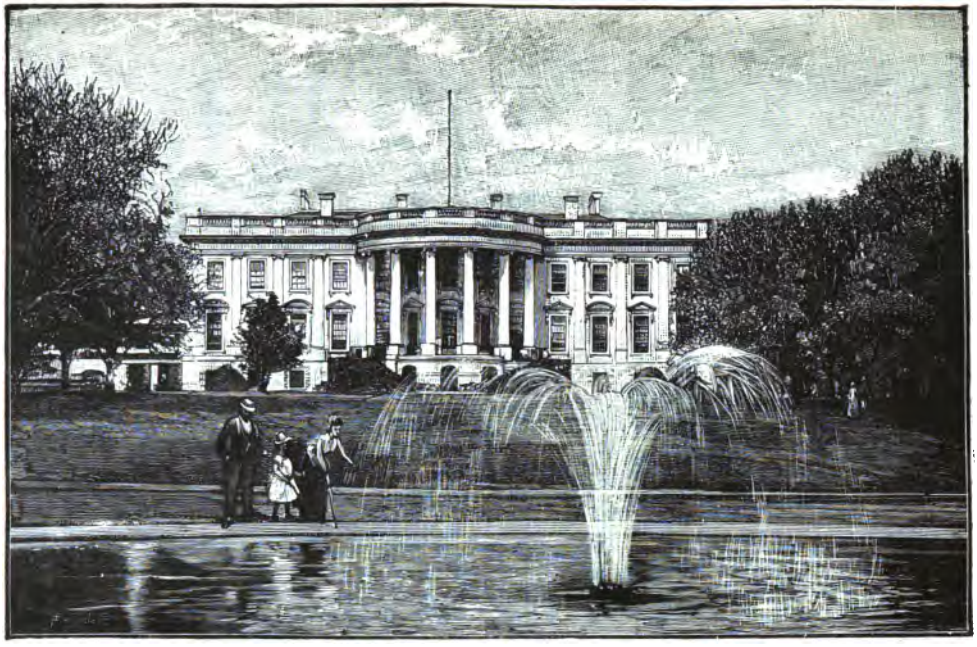
33.

1. The **Capitol** stands in the geographical centre of Washington, and overshadows by its magnitude and grandeur every other building in the city, public or private. It is surrounded by fifty acres of park and gardens, and is visible from all the main streets and avenues.

2. The general design of the Capitol is that of a great central building surmounted by a dome, and flanked by two wings. The front is built of glistening white marble, whilst the dome is of sheet-iron. Under the dome is the central hall, nearly one hundred feet in diameter. On the concave ceiling are painted all manner of historical subjects.

3. One of the wings is occupied by the Hall of Representatives, which is said to be the largest room of its kind in the world. Three hundred senators and fifteen hundred spectators can easily be accommodated at one time. Part of another wing is taken up by the Library of Congress. Here are gathered together half-a-million books in a space much too small to hold them comfortably.

4. There is plenty of statuary scattered about, but it is mostly of one, or rather two kinds. The great General is everywhere in evidence, whilst the other subject, in the words of Trollope, "represents a melancholy weak figure, without any hair, but often covered with feathers, and is intended



WHITE HOUSE. [*From a Photo by C. M. Bell.*

to typify the Red Indian. The Red Indian is generally supposed to be receiving comfort, but it is manifest that he never enjoys the comfort ministered to him."

5. The **Post Office** is one of the sights of Washington. It occupies an entire square, and is considered the most graceful building in the city. The front is ornamented by Corinthian columns; and, as it stands flush on the ground, without the usual array of stone steps, its beauty can be seen to advantage.

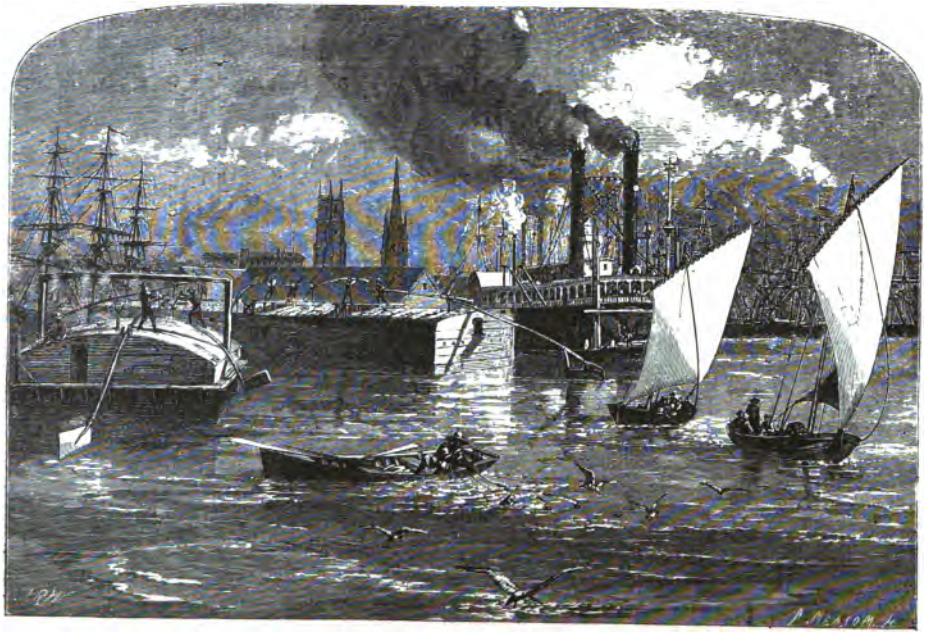
6. The "**White House**" is, of course, a centre of attraction for all travellers and tourists. It is the official residence of the President, the chief citizen of the United States. It is a plain, white stone edifice, surrounded by extensive grounds, and adorned with shrubberies, trees, and fountains. The grounds seem always open to the public, for it is part of the American theory of government that the meanest citizen has the right to approach and address the head of the Republic.

7. Washington, in addition to being political, is also scientific. It has several schools and colleges, good libraries and museums. One institution deserves special mention. It was the gift of one Smithson, an Englishman, and is used as a library, museum, and lecture hall. Within this building of many towers have lectured some of the best known men of England and America.

8. A few miles out of Washington is **Mount Vernon,** which was the height on which George Washington lived. It slopes gently down to the Potomac, and is pleasantly wooded. The house in which the great man spent much of his time has been acquired by the nation, and is now a popular show place. The chief centre of interest is the tomb of Washington and his wife. Their remains lie in an open vault guarded by an iron grating. To the American it is naturally a sacred spot. For here reposes the man who gave the United States the constitution which has made it what it is — a thoroughly honest patriot, around whose name has clustered innumerable legends—a man who seems to have combined the wisdom and astuteness of the politician with the courage of the soldier, and the simple unpretending manners of a country farmer—a man of whom England, as well as America, has every reason to be proud.

34.—NEW ORLEANS.

1. **New Orleans** is the capital of the Southern United States. It is the biggest little town on the Continent. It is on the noblest water-way in the world—the Mississippi. Its name is French, and French manners and customs meet one at every turn. Its people are French in their love of pleasure and fun, in their lightness of heart, and eagerness to enjoy themselves.



THE HARBOUR, NEW ORLEANS.

2. It resembles Paris, London, and New York, in having quarters for all sorts and conditions of men. There is a white quarter, a French quarter, black quarters and creole quarters; and, no matter where a man comes from, he will eventually settle in that quarter which suits him best as to disposition.

3. The climate gets decidedly tropical towards June; and, from then, till November, all who can afford to do so leave the city for the mountains or the forests of the north. Many even winter in New Orleans and spend the summer in Paris. Everywhere one meets with traces of this summer heat. The white, cool-looking dresses worn by the creoles, the universal house balcony, to screen the inmates from a blazing sun, all tell the same tale.

4. The mosquito too is ever present; and, despite the fact that electric fans are very common, this insect manages to make one's life fairly miserable. Here and there, in the gardens, may be seen a huge green barrel, perched high up among the magnolias and palm trees. These are the water cisterns of the people. There is no choice between rain-water caught in this way, and that drawn from the muddy Mississippi. Some thousands of pounds have been spent in keeping the waters of the Mississippi out of the town, but not a penny in making its waters fit to drink.

5. There is no well water. Dig down a few

yards and one comes to mud, a dark-coloured unwholesome fluid—the less it is disturbed the better. There is no solid earth anywhere around New Orleans. It is all built on a primeval swamp, once the delta of the Mississippi.

6. There is not even enough soil to bury the dead. They are, so to speak, laid to rest above the earth, in tombs of brick and marble specially built, so that neither mud nor water shall overwhelm them. The cemeteries of New Orleans are amongst the sights of the town. Perhaps nowhere in the world are the tombs so costly, or more gorgeously decorated.

7. This is an exceedingly busy city. Here may be seen men of all nations, English, American, Spanish, French and German, are perhaps the most common, but negroes, creoles, and even Indians are always to be met with. Anything may be bought and sold, from a ball of cotton to an alligator fresh from the river, snapping at everything within reach.

8. The great scourges of New Orleans are the Mississippi and Yellow Fever. There is to the north of the city something like eighteen thousand miles of navigable water, and often these waters rise and flood New Orleans for weeks together. Now and again comes Yellow Fever, which frightens visitors, empties the town of the wealthier residents, and almost destroys trade.

35.—ST. LOUIS.

1. The two rival cities of the west are, undoubtedly, St. Louis, on the Mississippi, and Chicago, on Lake Michigan. There are few cities in the world so favourably situated as either of them. St. Louis is in the centre of the Mississippi Valley, lying midway between the extreme western point of the Great Lakes and the Gulf of Mexico on one hand, and the Atlantic seaboard and the slopes of the Rocky Mountains on the other.

2. Further, the town is in the heart of a district capable of unlimited expansion. Land of remarkable fertility surrounds it on all sides, and it boasts of forty-six thousand miles of navigable water, flowing through a region abounding in coal, corn, metals, and timber. Any day, a mile of steamers may be seen ranged alongside its wharves, whilst all the main lines of railways have depôts in the town.

3. The growth of the city has been astounding. It has doubled its population every ten years, and its inhabitants are so confident of keeping up this rate of increase, that, in all public and municipal improvements, every provision is made to meet a similar expansion in the future.

4. The situation of St. Louis is naturally charming. It slopes gradually down to the Mississippi, whose turbid waters flow majestically along, looking, in certain lights, like a broad stream of molten gold. The shores, on either side, are connected by

a gigantic bridge, high enough to allow the largest Mississippi steamers to pass freely under its colossal arches. A German writer, speaking of this bridge in 1875, declared that it was without a rival in New or Old Worlds.

5. St. Louis was one of the old slave towns, and the civil war naturally arrested its growth for a time; hence, Chicago, filled mostly by emigrants from the old land and Northern Europe, went rapidly ahead, whilst the southern town stood still.

6. There, as elsewhere, climate has something to do with the growth of a town. During midsummer the days are certainly hot, the thermometer frequently registering ninety degrees and above. The nights are frequently as hot as the days. But for a moderately severe winter, no Northerner could make St. Louis his permanent home.

7. The most striking feature about the town is the number of gigantic hotels. Regardless of cost and appearance, they are run up to an enormous height. It is hard to say whether Chicago or St. Louis carry off the palm for colossal buildings. In this, as in almost everything else, these towns are keen rivals.

8. Like Orleans, St. Louis is a town of many nationalities, more than one-third of the people being either Germans or Irish. This mixture of races cannot be traced beyond the second or third generation. The children of these Germans and

Irish will probably be good Americans, and resent any allusion to their foreign parentage.

9. The great glory of St. Louis is the "levée," or long river beach, against which the big steamers

MISSISSIPPI STEAMER.

are run "end on." These steamers are quite a feature of the Mississippi. Resembling huge wooden houses, they are frail, flimsy-looking structures, but

are beautifully decorated. The railway has done much to destroy the ancient glory of the river steamboat, but the "levée" remains, and forms an esplanade of which the people are very proud.

36.—CHICAGO.

1. Chicago has been called the daughter of New York, and is growing with such rapid strides that it will soon equal its mother in point of size and population. It is admirably situated at the southern end of Lake Michigan. From it radiate twelve lines of railway, and it is the chief port of the whole lake system. It is connected with Canada by the St. Lawrence, and with New York and the Hudson by the Erie Canal.

2. We have already alluded to the marvellous growth of Chicago, and showed how it sprang from a trading fort to a gigantic city in a little over fifty years. Taking into consideration its situation and resources, its inhabitants may confidently look forward to years of prosperity. The town is the centre of three great trades. It is pre-eminent as a lumber market, as a provision market, and as a manufacturer of steel rails. To these it adds an enormous export trade.

3. Now, every one of these trades necessitates the handling of bulky articles, so many men and much machinery are gathered in one spot. One form of machine is everywhere to

be met with along the lake-side—that is, the grain elevator. It is an exceedingly ugly but useful contrivance for loading and unloading vessels with corn of all kinds. Trollope thus speaks of it:—

4. "An elevator is as ugly a monster as has yet been produced. In uncouthness of form it outdoes those obsolete old beasts who used to roam about

GRAIN ELEVATOR.

in the semi-aqueous world, and live a most uncomfortable life, with their great hungering stomachs and huge unsatisfied maws." The elevator itself consists of a huge movable trunk, which is let down into the interior of the ship. Within the trunk is an endless band, on which are fastened a series of shallow buckets.

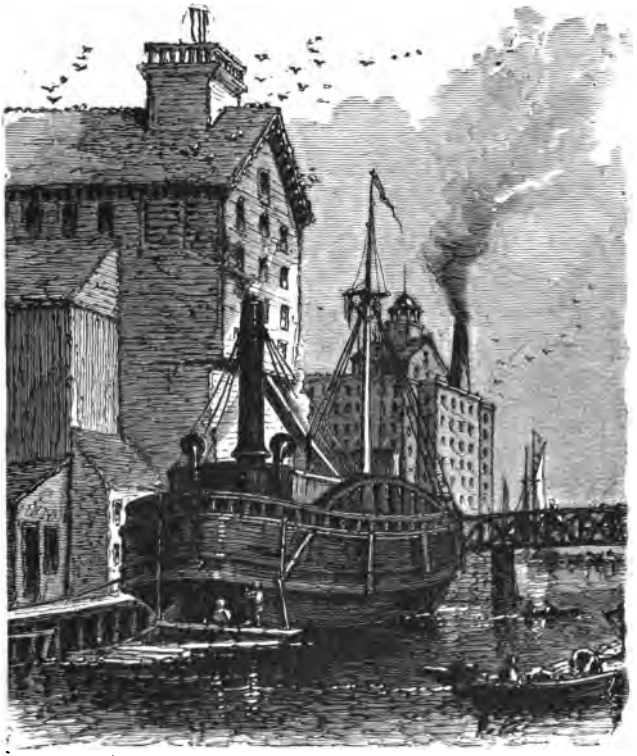
5. At the end of the trunk a few men are placed, whose business it is to fill these buckets. A steam-engine keeps the band of buckets going; and, in a few hours, the largest ships are emptied or filled. If the ship is being unladen, at the head of the elevator there are shoots leading off into huge granaries, where the corn is measured, weighed, and run into sacks ready for transport by rail.

6. These grain stores are one of the sights of the city. Some hold a million bushels of wheat, and the various floors and rooms constitute quite a little world, in which the particles are continually changing. Innumerable railway vans draw up alongside; their contents are clawed up into the interior of the building, only to be discharged through shoots into vessels lying on the other side of the store.

7. The cattle and tinned-meat trade is another enormous industry. Every day in the year there marches into Chicago a procession of cattle, sheep, and hogs two and a-half miles long and ten animals abreast. These will nearly all leave it again in the form of pork, bacon, and tinned meats of various kinds.

8. In Chicago the hotels are bigger and grander than elsewhere. Land is already very dear, so houses are run up to a great height, and as walking upstairs is not to be thought of, lifts are

provided in almost every house. The Post Office is a magnificent building; but, owing to the rapid growth of the town, additions are constantly being made.



BUFFALO GRAIN PROPELLER.

9. **Buffalo** lies at the entrance to the Erie Canal. It is another town of elevators, for here millions of bushels of wheat are changed from lake vessels

into suitable canal boats. At Chicago and other places, corn is bought and sold; at Buffalo, it simply passes through the town. It is strange to English eyes to see such vast quantities of wheat lying unguarded in bulk. With us it is always packed in sacks, or, as Trollope says, "It is aristocratic, and travels in its private carriage."

37.—PHILADELPHIA AND SAN FRANCISCO.

1. Philadelphia, the "Quaker City," is the second city in the States in point of population. It has been called also the "city of homes," because here, more than anywhere else in the States, we find that quiet domestic life which is such a feature in England, and which is almost entirely absent in New York and Chicago. The city is noted for the number and neatness as well as the durability of its buildings.

2. The great barrack-like tenements of New York find no place in Philadelphia. The houses are mostly built of brick, and are faced with marble or brownstone. Like all American towns, it is regularly laid out, and the streets are, as usual, lettered and numbered. Chestnut Street is one of the few which has a name, and it is the Fifth Avenue of Philadelphia.

3. The site was discovered in 1623 by the Dutch, and laid out as we now find it, by Penn, in 1682. There are few traces left now of the

people who first settled here; but, in the early days, the sober garb of the Quaker was frequently met with in the streets.

4. The people of Philadelphia are proud of their city, and have adorned it with many striking buildings and monuments. The City Hall is an elaborately decorated building, surmounted by a tower nearly five hundred feet high. It has a University, a Masonic Temple, and an Academy of Music which seats three thousand people. It has also many public gardens and parks.

5. One of these may claim, after Epping Forest, to be the largest park in the world. It contains nearly three thousand acres, and stretches for thirteen miles along the river. It has a site of great natural beauty, the old forest trees having been carefully preserved. A smaller park contains one of the finest collections of wild animals to be found in the world.

6. Philadelphia is the first manufacturing town in the Union. It has in the Delaware and Schuylkill Rivers plenty of water accommodation. From the neighbouring hills, as we have already pointed out, come enormous supplies of coal, iron, and limestone. That rarer product in nature, petroleum, is found close at hand. There is also plenty of space available for factories and dwelling-houses.

7. Away to the west, on the Pacific Coast, lies **San Francisco,** the "Naples of America." It is

THE MUNICIPAL BUILDINGS, PHILADELPHIA.

charmingly situated on a hilly site almost entirely encircled by salt water. This town again follows the regular American plan, and with the most disastrous results, as far as the natural beauty of the place is concerned. The streets at times ascend such steep hills that it is almost impossible to follow them to the end. Occasionally, the roadway is levelled, and houses are left standing on huge ramparts of sand, like frowning bastions, high above the level of the pathway.

8. Sir Charles Dilke says, "Not a street can be built without cutting down a hill or filling up a glen. Never was a great town built under heavier difficulties; but trade requires it to be exactly where it is, and there it will remain and grow." Although the town is in the same latitude as Athens, the climate is much more suitable for work. Every day a cool breeze rushes in from the Pacific, and tempers what would otherwise be a rather hot situation.

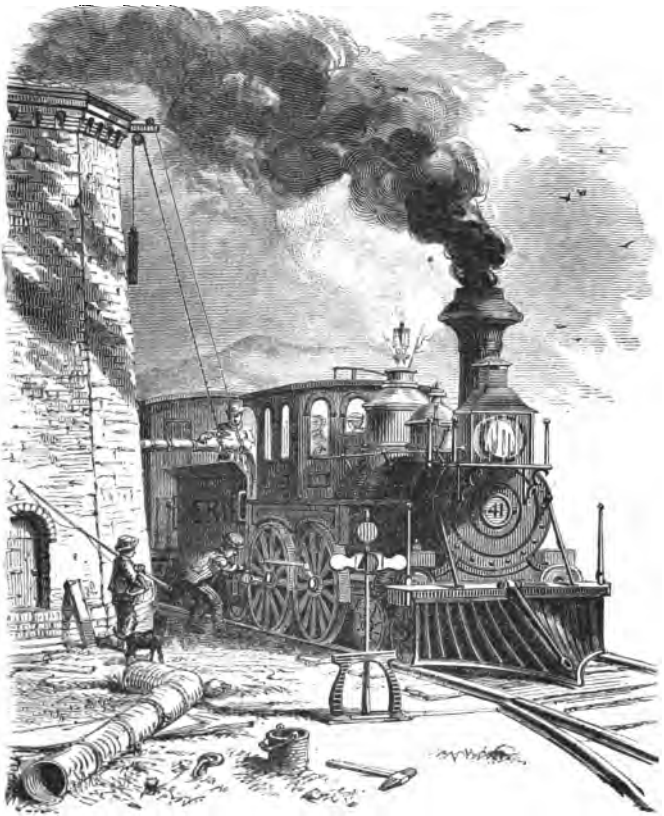
9. The entrance to the harbour is called the Golden Gate, through which a never-ceasing gale blows from the open sea, carrying with it a damp fog. This fog retarded the discovery of San Francisco for a hundred years at least. Drake and others sailed past without seeing that there was a bay. The magnificent harbour was first seen by missionaries who came overland, and it was at once seized upon as the site of a future city.

10. Perhaps there is no more mixed town in America than San Francisco. It is not too cold for Greek, Italian, or Chinese, nor too warm for Irish, Germans, or Scandinavians, hence we find all these nationalities working side by side. The Chinese, however, live in their own quarter, and in many ways they are an undesirable addition to the population.

38.—RAILWAYS.

1. The United States can boast of almost as much railway mileage as all the rest of the world put together. This might almost be expected, when we consider the extent and nature of the country. The size of many of the American States equals some of the older European countries. For example, Texas is larger than France; California has a greater area than Austria; whilst New York State is almost as large as England.

2. Again, the distances between the large commercial and industrial centres are enormous. Passengers who take train from New York to Chicago travel a distance exceeding that between London and Rome. The journey between Philadelphia and New Orleans is nearly twice as great as that between London and St. Petersburg. A traveller may enter the cars at New York and leave them at San Francisco. These places are two thousand five hundred miles apart as the



AMERICAN LOCOMOTIVE.

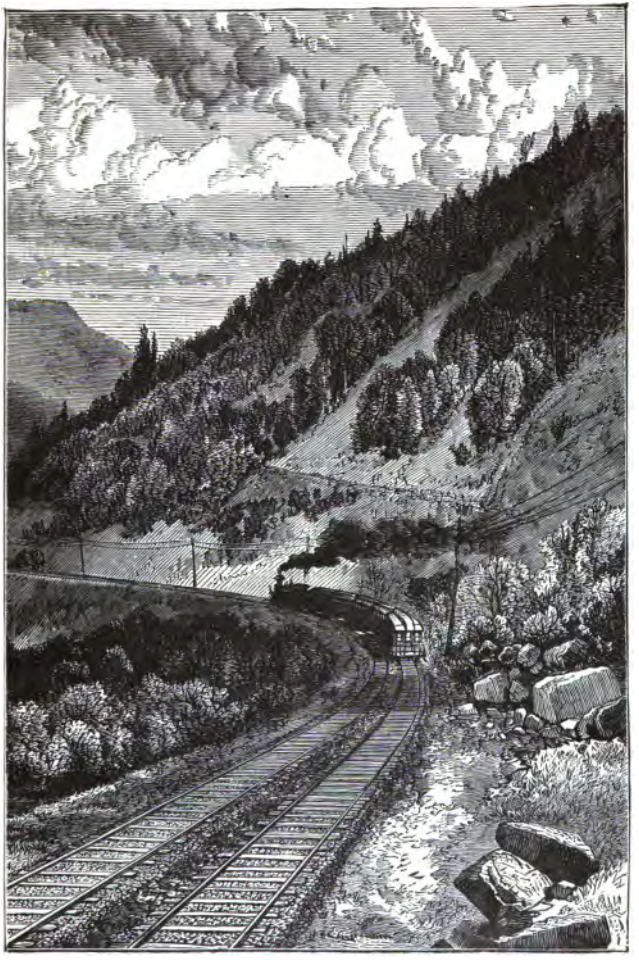
crow flies. The journey will take five days, and during that time the tourist will fare sumptuously every day, sleep comfortably at night, and the

latest news in the shape of special railway editions will be handed in with his coffee every morning.

3. The sleeping car is an American invention. Without it, no one would care to brave the discomforts of a four-thousand-mile journey. With it, everything in the shape of railway travelling is possible. The New Yorker sets off on his journey to San Francisco with as little preparation as the Londoner sets off for Margate or Brighton. He can get almost all he wants on board the cars, and whatever may be lacking he can have supplied at any town through which he passes, by simply informing the conductor of his needs.

4. Railway companies vie with each other in supplying the American public with gorgeously appointed cars. The "Silver Palace" cars and the "Pullman Palace saloon and sleeping cars" are sumptuously furnished. Hence, the comfort of railway travelling in the States far surpasses anything of the kind in Europe.

5. Previous to 1846, communication with the Far West was an exceedingly difficult matter. Stage coaches ran between the principal towns, over roads of the roughest description. Accidents were of daily occurrence. A prominent public man was upset thirteen times in one journey. Every old traveller was able to show many scars and bruises, as the result of frequent journeys; whilst the speed was not at all proportionate to the



A RAILWAY SCENE.

danger, for these coaches only averaged three and a-half miles an hour.

6. In 1851, parties were sent out to survey a route which would connect the Atlantic with the Pacific. Thirteen years later the work was begun, and progressed at an unheard-of rate. Two and three miles of rails were laid daily; and, in one instance, as many as eight miles were laid. Difficulties of every kind had to be encountered. Indians and buffaloes had to be reckoned with. Miles of newly-laid tracks were destroyed either by Indians, river floods, or mountain torrents.

7. Enormous rivers had to be bridged, the Rockies had to be tunnelled, and miles of sheds erected to protect the line from snow, and avalanches of soil and stones from the steep hillsides. One tunnel in the Sierra Nevadas compares in length and costliness with that of Mount Cenis in Europe. This first, or **Central Pacific line,** was finished in 1869. Since then two other Pacific lines have been opened for traffic.

8. The **Northern Pacific Railway** runs from Lake Superior to the Pacific, and throws out branches north and south, connecting it on one side with the Canadian system, and on the other with the Union Pacific, which runs from Chicago to San Francisco. This line crosses the Rockies at an elevation of nearly nine thousand feet, and in Sherman claims to have the highest railway

station in the world. At a similar elevation in Great Britain, the station would be permanently snow-clad.

9. The **Southern Pacific Railway** stretches from New Orleans to Colton, where it joins a line which runs parallel to the Pacific coast. A branch from this line runs south over the Eagle Pass to the city of Mexico, whilst another branch runs north to Cheyenne, connecting the southern line with the Union and Central Pacific Railways.

10. Chicago is probably the greatest railway centre in the world. From it radiate lines in all directions, the three principal companies alone representing twelve thousand miles open for traffic. Speaking generally, the lines are not so solidly constructed as in England. The rails are often left unguarded, and it is no uncommon thing to see cows placidly grazing between the metals, whilst in towns the clanging of the locomotive bell may be heard in all the principal streets.

39.—GOVERNMENT.

1. It is the proud boast of America that its humblest citizen has a voice in the making of its laws. What is known as the Constitution of the United States is mainly the work of one man—its first president, Washington. An English statesman has said of this vast body of laws relating to the government of the United States—"As far as I

can see, the American Constitution is the most wonderful work ever struck off at one time by the brain and purpose of man."

2. At the Declaration of Independence, it was asserted that all men were born free and equal, and that each had a right to his life, his liberty, and happiness. Let us now consider in what ways the people of the United States give effect to these principles.

3. The Federal Republic consists of forty-four states, six territories, and one federal district. These numbers are continually changing; for so soon as a territory becomes sufficiently peopled, its inhabitants claim the right of governing themselves—that is, of adding another state to the Union. Every state has its own little parliament, which makes its own laws, has its own president, court, judges, militia, &c. It is absolutely independent of any other state; and, so long as it deals with purely local matters, can defy every other division of the Union, and even the great assembly at Washington.

4. There are certain things, of course, a local or states parliament cannot do. It cannot declare war; it can have no dealings with a foreign power; it cannot negotiate a treaty; it cannot alter the coinage, nor have any but a general system of weights and measures; nor can it, in any way, interfere with the liberty or laws of

another state. But it can make its own marriage laws, educate its children as it thinks fit, buy and sell land, legalise the drink traffic, and shut up public-houses without appealing to or receiving the sanction of the central government at Washington.

5. Thus, every state secures its happiness by its own methods. A manufacturing state like Pennsylvania will, in this way, have different laws and customs to a mining state, such as California, or an agricultural state, such as Texas; and the cultured inhabitants of Boston will obey laws and regulations which could scarcely be enforced in San Francisco or New Orleans.

6. Every man who is of sufficient age, and who is neither a criminal nor a pauper, has a vote. He may live in Fifth Avenue or have a log cabin in the backwoods, but if he likes to go to the ballot-box his vote will be accepted, and he is conscious, in giving it, that, whether he be artisan or millionaire, his vote has just as much weight, and no more, as any other man's in the States.

7. The American **Congress,** or Parliament, is composed of two houses—the Senate and the House of Representatives. The **Senate** is composed of two senators from each state. These are selected by the local parliaments, and serve for six years. No man in America is chosen for life to serve his country. Every six years at most he has to run

the gauntlet of another election. In this way every legislator is kept closely in touch with the opinions of his countrymen and the wants of the district he represents. To secure men of experience, every senator must be at least thirty years of age, and have lived eight years in the Union.

8. The lower house, or **House of Representatives,** consists of members of the various states or territories. The members who represent territories have no votes, but they may listen to and take part in the debates. Every representative must be at least twenty-five years of age, and must have lived for seven years in the United States.

9. At the head of the United States Executive is the **President,** and the Americans claim that he is the most powerful ruler in the world. He is the chief magistrate in the land; he is the commander-in-chief of the army and navy. If the country were threatened, seven millions of soldiers would respond to his call to arms. He has not the power to declare war without the consent of Congress; but war once declared, he may carry it on as he thinks fit.

10. The President serves for four years. His salary is about ten thousand pounds a-year, and when his term of office expires, he retires into private life without place or pension. He has received the highest honours his fellow-citizens can bestow upon him. He has for four years, or more

if re-elected, played the part of a limited monarch, in a realm which compares for extent, wealth, and population with the empires of Russia, Germany, and Britain.

11. The President's chair has, almost without exception, been filled by men of singular ability. The life of the President must be blameless, and his public career must bear the closest scrutiny ere he can hope to occupy the White House. Birth or poverty are no barriers to an aspirant for this high honour. Garfield was a poor teacher who lived in a log cabin; Lincoln was a west country lawyer, and Grant a soldier. It would be exceedingly difficult to parallel the careers of these three men in any of the Old World countries. The political genius of Washington, Lincoln, and Garfield has never been surpassed, whilst the achievements of Grant will place him in the front rank as a military commander.

40.—ALASKA.

1. Away quite in the north-west of the continent, and partly within the Arctic circle, lies the once Russian territory of **Alaska.** It is famous as being the finest sealing ground in the world. The Russians, however, found this outlying portion of their vast empire rather a burden to them; and, in 1867, it was sold to the United States.

2. It looks small on a map, but it is really ten times as large as England, and consists of a rough, wild country, full of lofty, snow-clad mountains, thickly-wooded valleys, and a coast-line as broken and indented as that of Norway. But for its climate, it would soon become the happy hunting-ground of tourist and fisherman.

3. Except for a few months of the year, the climate is cold, bleak, and damp; but still it is rather better than that which prevails on the eastern side of the continent in the same latitude. Radishes, lettuces, turnips, and other watery vegetables grow well when planted, but they will not produce seed; whilst corn grows rapidly at first, but obstinately refuses to ripen.

4. A climate which will not ripen the cereals common to the temperate zone cannot be looked upon as a good settling-place for the Anglo-Saxon race.

5. The Yukon, which may be regarded as one of the great rivers of the earth, passes almost through the centre of this territory. There is timber enough in its valley to supply the States for many years to come. Still, Oregon and Washington produce it in equal abundance, and in places where it is convenient to the markets of the world.

6. The inhabitants of this far-off land vary more than either the scenery or the climate, for

in the different settlements you may meet Russians, Indians, Creoles, Esquimaux, and Aleutians, in addition to American and Canadian sealers.

7. The old Russian capital was New Archangel, which has now a population of nearly three thousand, sealing having done more for the town than the stories of fossil ivory, which the Russians always supposed would be found hidden in the creeks and bays of the frozen ocean.

8. For years, all kinds of exaggerated stories about buried ivory found a place in the literature of the Russians. They are a simple, kindly, but somewhat credulous people, and when the Cossack Dschenew carried back with him, in 1728, stories of hairy monsters with prodigious tusks of ivory, the Czar of that day annexed Alaska, and several Russians set out to make their fortunes.

9. Ivory was, and is still to be found in the valley of the Yukon, but it is poor in quality, much injured by the weather, and has little commercial value. We shall show in the next chapter where the real wealth of Alaska is to be found.

41.—SEALS AND SEALING.

1. Where Asia and America come closest together, forming a series of stepping-stones between the two continents, we find innumerable rocky islets. These islands have lately sprung into considerable importance, and almost threatened to sever

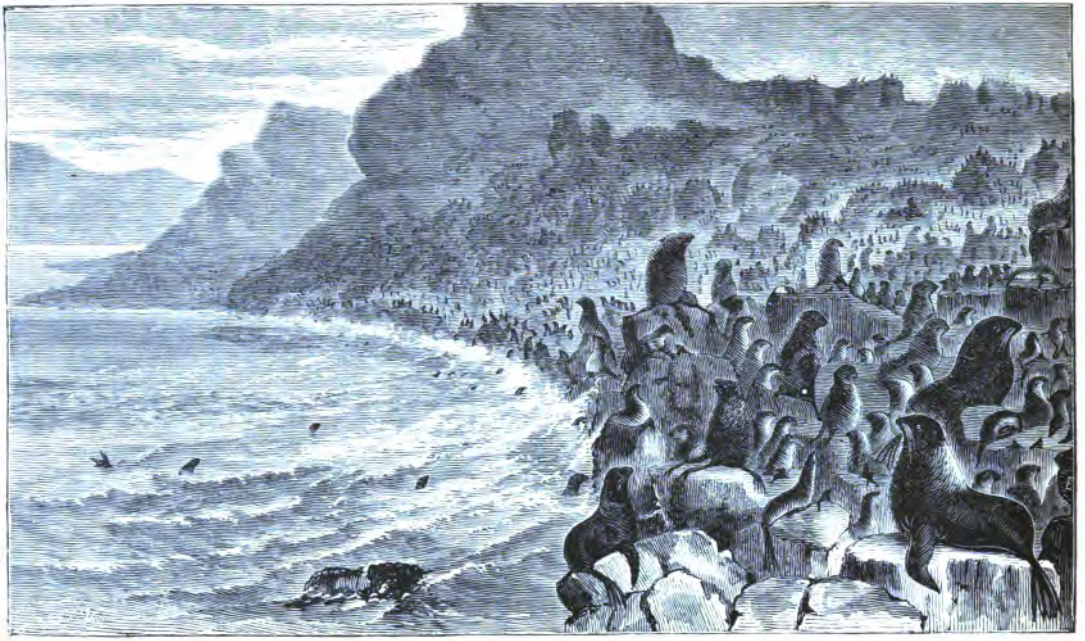
the friendship of two great peoples—the English and the American. For here is the home of the fur-seal; and whilst we claim the right to kill seals three miles away from land, the Americans sought to extend that distance, as the seal requires protection at certain times of the year.

2. The seal, as we all know, is amphibious. He is quite at home in the water, although he is really a land animal, and is born on shore. Like the duck, he soon takes to the water, although, perhaps, not quite naturally, for the young seals would speedily drown themselves if not carefully looked after by their parents.

3. It is, we are told, a somewhat amusing sight to see a party of young seals being led down to the beach, and to watch them helplessly floundering for the first time in what is soon to become their native element. Having been taught to swim, the whole colony takes its departure for the open sea; and where they spend their time from October to the following June is precisely one of the points that the American and Canadian Governments are at present anxious to find out.

4. It is thought they spend the winter in the open sea to the south of the Aleutian Islands. It is certain, too, that some go north into the Arctic Ocean, for both polar bear and Esquimo would fare badly if it were not so.

5. From the middle of June to October, we



ROOKERY OF FUR SEALS.

know exactly where they are. It is about this time that the young are born; and so we find them in immense numbers visiting the islands off Alaska. They seem to have a great liking for the rocks on which they were born, for they come back year after year to the same spot, as swallows do.

6. The whole beach and hillsides near the shores are literally black with seals. The rocks, which they have scrambled over for ages, are smooth and polished, and the whole neighbourhood has a strong and disagreeable odour.

7. They are easily captured, for it is only necessary to get between the animals and the water, to shout and wave sticks, when the whole flock can be driven like sheep to any spot where they can be killed and skinned. The skins are salted and brought to London. Here they are dressed by a process which has long been kept a secret.

8. No one, who sees the dirty evil-smelling skins as they leave the ship, could possibly imagine that they could be transformed into the beautiful rich brown seal skins we see in the furriers' shops. The Aleutian islander gets about eighteen pence for his share of a skin, which, when prepared for the London market, is worth a five pound note.

42.—TIDES.—I.

GENERAL INTRODUCTION.

1. Every schoolboy who has visited the sea-side must have noticed that the water does not always remain at the same level. Twice a-day vast plains of sand, like those at Blackpool or Tynemouth, are invaded by the waves. Deep bays are formed far into the land, and ships sail, here and there, over tracts, where a few hours before children might have been making castles in the sand.

2. We, in England, who are familiar with this fact, can scarcely realise how astonished are the natives near tideless seas when they visit our shores. The dwellers on the shores of the Mediterranean or Baltic Seas have no such constant change, and the story of Canute and his flatterers would have little or no meaning for the Greek or the Roman, whose waters remain almost constantly at the same level.

3. Twice a-day comes a great tidal wave, which transforms simple rivulets into navigable rivers, changes basins filled with mud into spacious harbours, covers up sandbanks and rocks, and enables ships to glide safely over what would otherwise be impassable barriers.

4. Six hours later all this is changed. Ships are lying stranded in all directions. The fisherman unloads his boat, or mends his nets by its

side. Islands emerge from the waters, and great bays become no more than plains of sand. The coast-line is constantly changing its shape, and every change of the tide brings into view an ever-varying landscape.

5. This great movement of the waters is also accompanied by powerful currents, which set in from the ocean to the shore, and from the shore to the ocean. The air above the water is also somewhat influenced; for, on calm days, gentle breezes may sometimes be felt coming from the sea with the flowing tide.

6. This constant ebb and flow of the tide has also its effect on commerce and civilisation; "it is," says a continental writer, "to these movements of the sea that England owes, in great part, her power and glory."

7. From the earliest times, it had been noticed that the moon, in some way or other, influenced the tides. It was observed, by those who went about in ships, that full moon and high tides came about at nearly the same time; whilst it was also noticed that, when the moon was new or full, the water flowed further up the beach than at other times. It was also noticed, as the months rolled by, that in March and September, when the sun crossed the Equator, the tides were specially high, as if to emphasise the importance of these events.

8. Our old sea-going ancestors, the Scandina-

ST. JOHN, BACK OF THE HARBOUR AT LOW TIDE.

vians, had their own explanation of all these facts. This mighty rush of waters, said they, was caused by the god Thor blowing his horn under water, and, by his powerful breath, causing the waves to rise and fall by turns. It was not until the time of Newton, that our men of science knew exactly in what way the sun and the moon influenced the waters of the earth.

9. The falling of the apple in Newton's garden led that thinker to investigate that great force, which not only makes an apple fall, but keeps our earth and moon in their proper course, and holds together the very universe. That same force, called gravitation, is responsible for the tides, and we shall show in the next chapter exactly how it acts.

43.—TIDES.—II.

THE MOON'S ACTION.

1. We shall best understand how the tides are caused if we imagine our whole earth to be covered with water, and subject only to the attraction of the moon. This then is what would happen. The waters immediately under the moon would rise, because not only does the earth attract the moon, but the moon attracts the earth.

2. Further, it attracts land and water equally, but the land is not as free to obey as the water is. One particle of land is joined to the

next in such a way that it can only move if every other particle moves with it. So that, however anxious any particular particle of our earth may be to reach the moon, it is kept down by the particles around it.

3. This is not the case with the water. The molecules, as they are called, glide easily over each other; and, when the moon pulls, the molecules nearest it rise up, so to speak, as if desirous of reaching that body. They can only go a short distance, however, on their moonward journey. In the open ocean the rise is only a few inches, whilst in funnel-shaped bays the water has been known to rise fifty, sixty, or even seventy feet.

4. Now, if the world stood still, there would always be this mound of water facing the moon; and tides, as we understand them, would cease to exist. But the world is always on the move, and every twenty-four hours, or thereabouts, presents each part of its surface to the moon. Hence it is that this tidal wave rolls round the world, as every patch of water is successively brought right under the moon's influence. This accounts for one of the tides we have each day.

5. Now, whilst a hillock of water is being formed directly under the moon, a corresponding hillock is being formed on the other side of the world away from the moon. How is this? Well, seeing that the moon attracts the solid earth as

well as the water, and that it yields to this attraction all at once, so to speak, the water is left somewhat behind, and forms a high tide on the side remote from the moon.

6. This effect can easily be produced on a smaller scale. Take a saucer, and half fill it with water, and draw it along the table. Every part of the saucer moves at the same time; but not so the water. Some part of it cannot keep pace with the saucer; if that vessel is moved from south to north a mound of water will be formed on the southern edge of the saucer; and if this moving be done suddenly, some of the fluid will part company with the rest, and escape altogether. This is exactly what would happen if our world revolved very rapidly on its axis.

7. Thus, we see, there are formed, exactly at the same moment, two tidal waves, one on each side of the world, and they keep following each other round at intervals of twelve hours. Now these waves travel from east to west—that is, in the opposite direction to the rotation of the earth on its axis. The tides act in this way as a drag on the earth's motion, and must, in the long run, lead to a slackening of the speed with which it turns on its axis.

8. Professor Tyndall and others have calculated exactly the amount of this retarding influence of the tides; and we are assured that, as time rolls

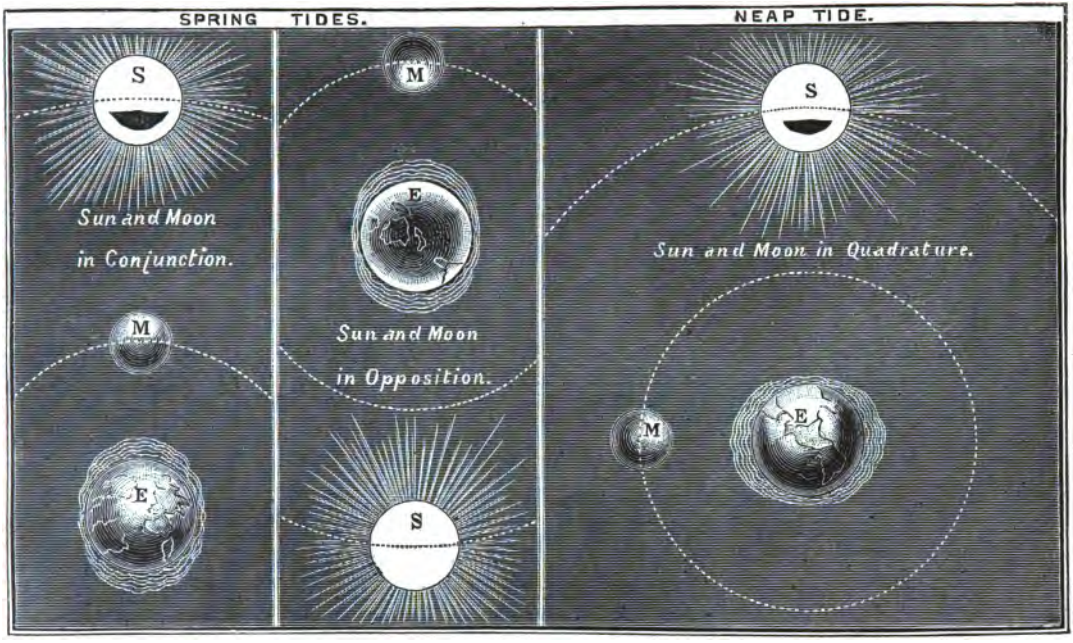


DIAGRAM OF TIDES.

on, the earth's daily motion will get slower and slower; and, as a consequence, the day will get longer and longer, until the inhabitants of our earth may bask in the sunlight of a day as long as falls to the present lot of the moon.[1]

44.—TIDES.—III.

THE SUN'S ACTION.

1. But the whole theory of the tides is not quite so simple as we made out in the preceding chapter. Our earth is affected not only by the moon, but by every other body in space. We may, however, neglect the effect of the stars and planets, but we must take into account the attraction of the sun on the great oceans of the earth.

2. And here a seeming difficulty presents itself. The sun is very much larger than the moon. Its attractive force is really one hundred and sixty-two times greater than that of our satellite; and if the whole of this force were to be exerted, then our tides would be twice the height of Snowdon or Ben Nevis.

3. The sun, however, is very much further off than the moon—so far, in fact, that every particle of water upon our globe may be looked upon as almost equally distant from the sun, and, as a consequence, almost equally attracted by it. Now,

[1] *i.e.*, about a fortnight's sunlight.

the moon, although much weaker, is also much nearer some parts of the ocean than it is to other parts. Thus its influence is greatest on those portions immediately under it.

4. Hence it comes that the stronger, but more distant sun exerts a really less influence on the water than the weaker, but nearer moon. In fact, if the moon is capable of raising a three-feet tidal wave, the sun could only lift the waters to the extent of one foot; just as a boy who was favourably situated could lift a greater weight than a man who was awkwardly placed.

5. It sometimes happens, however, that both the sun and moon are working together; they are both pulling in one direction. Then the tides are higher by several feet. This is the cause of the **spring tides.** Every boy who reads this book will have noticed that there are times when, even on cloudless nights, the moon does not make its appearance. Earth, moon, and sun are then nearly, if not altogether, in the same straight line.

6. Moreover, sun and moon are on the same side of the earth, and thus their attractive force is exerted in the same direction. Earth, moon, and sun are again nearly, if not altogether, in the same straight line, when the lunar orb is fullest. But here the earth is between sun and moon, and then these two bodies are tugging at the earth from opposite directions.

7. Strange as it may appear, the effect is just the same as if they were helping each other. For, whilst the moon is raising its mound of water on each side of the world, the sun is doing the same thing, but from an opposite quarter.

8. When the moon is only showing half its surface, it is acting at right angles to the sun's force. Then, the moon's tidal wave is diminished by the quantity of water which the sun is attracting in another quarter of the world. Thus, twice a-month, that is at full and new moon, we have high, or **spring tides,** whilst, in between, we have low, or **neap tides.**

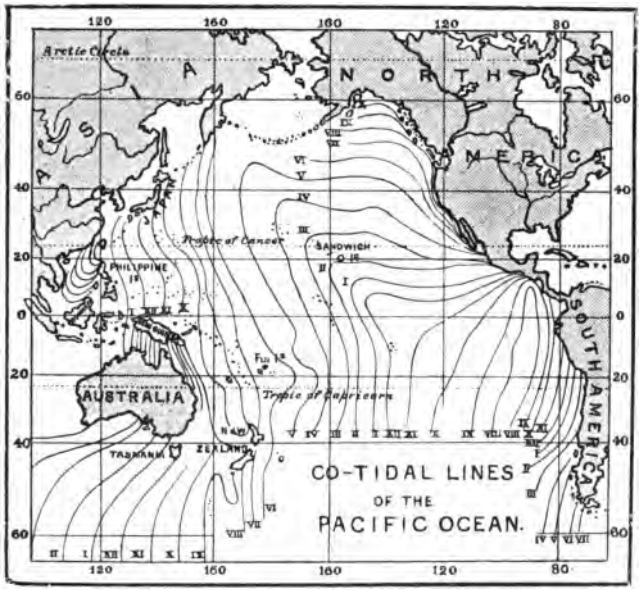
9. Were the world, as we have at first supposed, covered with a uniform sheet of water, all of this would go on, year after year, with the utmost regularity. But the various islands, shallows, and vast land masses, and even the winds, divert the tidal waves from their course, and make them vary somewhat. Still, we know enough to predict, years before, if necessary, when it will be high water at any given part of the earth's surface.

45.—TIDES.—IV.

THE COURSE OF THE TIDAL WAVE.

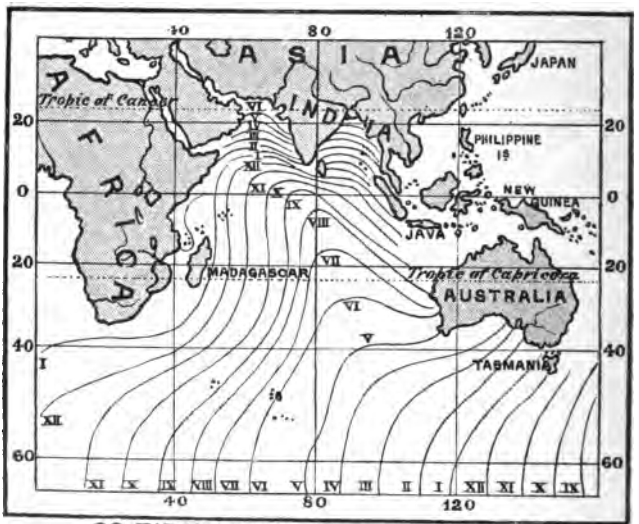
1. The birth-place of the tides is in that great ocean which lies in the Southern Hemisphere. It is here, in this vast sheet of which the Indian,

Pacific, and Atlantic are, so to speak, outlying portions, that the sun and moon combined raise the first tidal wave. We propose to follow it in its course round the world.



2. It is supposed that this wave circulates incessantly throughout the Antarctic Ocean. Here it can travel without let or hindrance right round the world. Its southern force is expended amongst the bergs and floes of that great ice sheet

which fringes the South Pole. Into this region man ventures only occasionally; and, whether there are open seas beyond this impenetrable ice, we can only conjecture. Certainly, they must be tideless, if they exist at all.



CO-TIDAL LINES OF THE INDIAN OCEAN.

3. Starting then from the Central Pacific, the great tidal wave travels east, and strikes at the same time the coasts of New Guinea and Australia. Fourteen hours later it reaches the

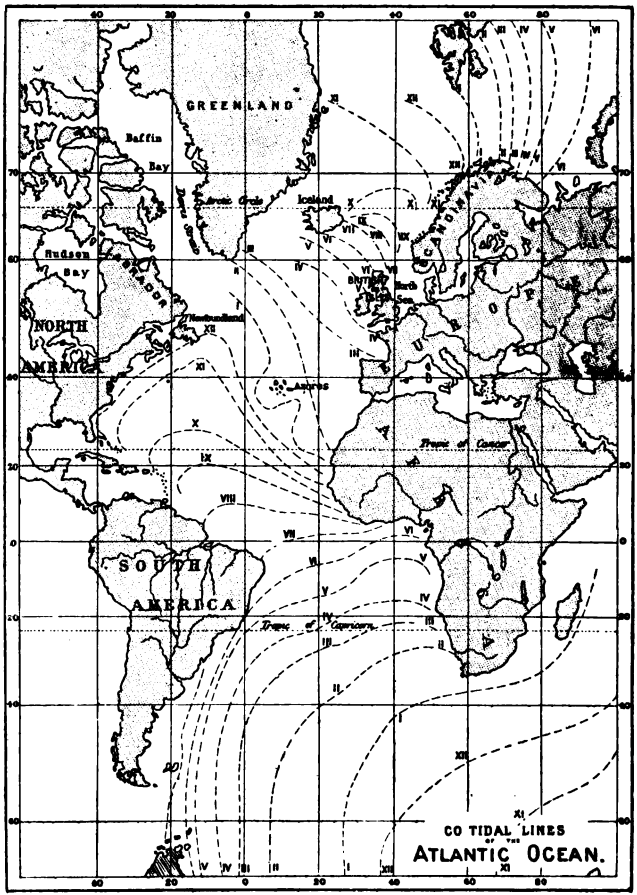
eastern coast of Africa. It takes seven hours to cross the Atlantic, and strikes the shores of South America from Tierra del Fuego to the estuary of the La Plata.

4. Here it receives its first great check. It has hitherto travelled from east to west, but the American continent bars its further passage, and causes it to bend towards the north. We may now look upon the Atlantic as a huge oceanic valley, up which this tidal wave travels at the rate of four hundred miles an hour.

5. It is necessary here to guard against a common mistake. In the great oceans, only the shape of the wave travels, the water itself remains practically stationary, rising or falling a vertical height of a few inches or feet as the case may be. A simple illustration will help us to understand this.

6. Take a rope or a clothes line lying on the ground. It is possible, by a sharp jerk of the wrist, to make a wave run right along the line at a very rapid rate. If you fix your eye on any given part of the rope, you find that it does not move except vertically up or down. It is the wave-shape which travels along the line, not the particles of which it is composed.

7. We have seen, then, how the tidal wave has changed its direction. It sweeps up the Atlantic and reaches the Irish Sea about the same time as


GREENLAND
Baffin Bay
Hudson Bay
NORTH AMERICA
Iceland
Azores
Tropic of Cancer
SOUTH AMERICA
Tropic of Capricorn
CO TIDAL LINES OF THE ATLANTIC OCEAN.

it enters the Bay of Fundy, having accomplished its journey from the Cape of Good Hope to the British Isles in about fifteen hours. Now the wave is in shallow water, and constant friction against the land has lessened its speed.

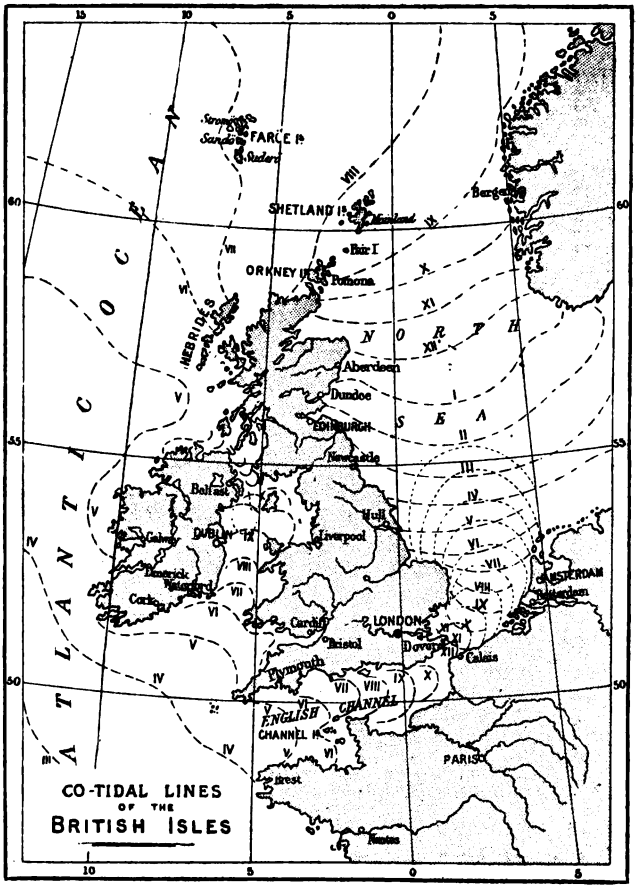
8. Off the coast of Ireland the wave splits up into two parts, one going north round the Orkneys, and so into the German Ocean, the other part finding its way up the English Channel. The wave is now going so slowly that it takes as long to travel from the Orkneys to the Thames as it took to traverse the whole length of the Atlantic.

9. We have now traced the tidal wave from its cradle in the Antarctic Ocean to the mouth of the Thames. It has taken two and a-half days to complete this journey. In the meantime, the moon has had time to raise up five other waves, which are rapidly following in the wake of the one we have described.

46.—TIDES.—V.

TIDAL CURIOSITIES.

1. Those whose lives are spent at sea continually notice that the tides do not rise everywhere to the same height. In the estuary of the Severn, for example, the waters rise some sixty or seventy feet, whilst a little further to the west, at Arklow, in Ireland, scarcely any tide can be detected. It will be found that all these variations can be


15
10
5
0
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60
55
50
ATLANTIC OCEAN
NORTH SEA
FARCE Is
SHETLAND Is
Bergen
Fair I
ORKNEY Is
Pentland
HEBRIDES
Aberdeen
Dundee
EDINBURGH
Newcastle
Belfast
DUBLIN
Galway
Limerick
Waterford
Cork
Liverpool
Hull
AMSTERDAM
Amsterdam
LONDON
Cardiff
Bristol
Dover
Calais
Plymouth
ENGLISH CHANNEL
CHANNEL IS
PARIS
Brest
Nantes
I
II
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X
XI
XII
CO-TIDAL LINES
OF THE
BRITISH ISLES

explained by studying carefully the geographical position of these places.

2. If we look, for example, at the Severn, we see that its estuary is shaped like a huge funnel facing the direction from whence comes the great tidal wave. An immense body of water is forced into this funnel twice a-day; and, as the estuary gets narrower and shallower, the waters are heaped up to a great height.

3. But perhaps the grandest example of the heaping up of waters caused by the gradually-narrowing channel is to be found in the Bay of Fundy. Here, twice a-day, immense neutral shores which are neither land nor sea change into deep gulfs, and stranded ships rise and float with sails spread, whilst towns lost in the interior of the land find themselves seated on peninsulas surrounded by the sea.

4. At St. John, New Brunswick, there is a cascade formed by the river which is only visible at low water. When the tide reaches the foot of the cliff, the height of the fall gradually diminishes, until at last it is entirely drowned by the salt waters, which, spreading over the upper terrace to the height of sixty feet, permits vessels to penetrate into the spacious harbour beyond the waterfall.

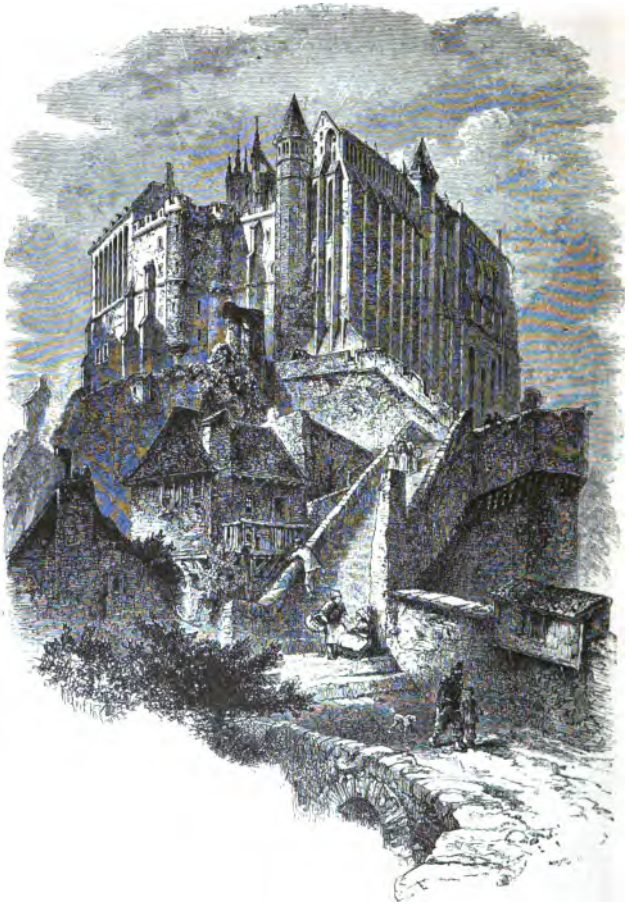
5. In Europe, the finest example of the grandeur of the rising tides is to be seen in the Bay of

St. Michel, in France. Here, right in the centre of the bay, rises a picturesque rock, on which has been built a castle, which has, in its time, served as abbey, cloister, fortress, and prison. No better spot could have been chosen for any one of the uses to which it has been put. At low water it is surrounded by one hundred and fifty square miles of sand resembling a huge bed of ashes.

6. But when the tide, swifter than a horse at gallop, rises foaming over the gentle slopes of sand, a few hours are sufficient to transform the whole bay into a greenish-grey sheet of water. At ebb tide the waters retire at the rate of seven miles an hour, laying bare again a great desert of sand, intersected by little rivulets of salt water.

7. A little south of Wicklow there is a small area of water where neither rise nor fall has ever been observed. Here, again, the position accounts for this curious fact. It is the meeting-place of two tidal waves, one of which has travelled round the north of Ireland and through the Irish Sea, whilst the other has come direct from the Atlantic.

8. Now it so happens that the northern wave is a few hours late, and its period of high water coincides with the low tide of the more direct wave from the Atlantic. One wave destroys the other. This takes place just off Arklow, which place forms the "hinge," so to speak, on which these two tides turn.



ST. MICHEL'S MOUNT, FRANCE.

9. The same kind of thing takes place off Dover, where the Channel tide and the wave from the North Sea happen to meet. Here the difference between high and low water rarely exceeds two feet. This meeting of the tidal waves is often accompanied by strong currents and "races," or small whirlpools. Thus it is that the English Channel is more dreaded by sailors than the open Atlantic.

47.—OCEAN CURRENTS.—I.

THE OCEANIC CIRCULATION.

1. In addition to the great oceanic movements described in the preceding chapter, we have others, not perhaps so striking, but no less important, considering the work they do. These are the great ocean currents. By their action enormous volumes of water, often more than a thousand miles wide and hundreds of fathoms deep, move across the face of the ocean.

2. There is a constant circulation going on. The water from the poles finds its way to the equator, and after being warmed beneath the rays of a tropical sun, finds its way back again to its polar starting-place, only to begin another long journey. Thus the ocean is literally what Homer says of it, "the great salt river" which rolls round the earth in one immense circuit.

3. Were not this so, the ocean, vast as it is, would in some places become stagnant as any way-side pond, for, despite these currents, a few weeks' calm in the tropics is sufficient to cover the sea with a slimy ooze. Coleridge was not altogether drawing on his imagination when he makes the Ancient Mariner say—

> "The very deep did rot,
> And slimy things did creep with legs,
> Upon a slimy sea."

4. Besides the surface circulation of the waters, there is a vertical or up-and-down circulation. Every drop of water is continually changing its place in the abysses of the ocean. When cooled, it descends; when heated, it rises. It is this perpetual change which gives the ocean its wonderful uniformity. No matter where we see it, its general appearance, saltness, and colour are pretty much the same in all latitudes.

5. These ocean currents vary in speed like the rivers on land. Some, like the Gulf Stream, course rapidly along between banks of cold water, whilst others are so gentle in their movements that only the most patient observers have been able to detect any motion whatever. But whether swift or sluggish, these ocean rivers are doing a great work in preventing stagnation and modifying climate.

6. We shall have to show, presently, how our

very existence as a great power depends upon the fact that our shores are washed by one of the great currents of the ocean. If anyone doubts this statement, let him turn to Labrador. There you have an immense territory, where the cold is so intense as to be a bar to settlement. From October to May the thermometer falls, and keeps below freezing-point. Whilst our English hedges are gay with blossoms of all kinds, the soil of Labrador is ice-bound—its valleys are glacier-clad, and its coasts are strewn with floes and stranded icebergs.

7. Cold currents from the Arctic Ocean sweep past, enveloping everything in mist and fog. None of our English fruits and grains will ripen, and only a few hardy birches stand out in the wintry landscape. The land is utterly incapable of supporting a settled population. The few inhabitants are wandering Eskimo, who migrate from place to place as they exhaust the resources of any district.

8. Perhaps there is no more terrible reading than the accounts the Moravian missionaries give us of this Labrador coast. Their lives seem to have consisted of one continual struggle against the elements. No sooner did one winter pass, than preparations had to be made for another. Wood, food, fodder for cattle, had all to be laid in, in immense quantities; and, but for the fish of the

adjacent sea, starvation would often have overtaken the entire colony.

9. And all this in a land lying in the same latitude as the British Isles. Were the Arctic currents and the Gulf Stream to change places,

ESQUIMO'S WINTER HUT

we should again have glaciers in Wales and Cumberland; our harbours would be frozen the greater part of the year; whilst the Thames and every other English river would find their way to the sea under thick-ribbed ice for eight months of the year.

48.—OCEAN CURRENTS.—II.

CURRENTS MODIFY CLIMATE.

1. We must now consider how ocean **currents** washing the shores of any country can **modify** the **climate** of that country. Almost for three-quarters of the year the winds come to us from a westerly direction; and, consequently, from the Atlantic Ocean. These winds are really what are known as the return trade winds, and balance those regular, steady, north-east winds which so frightened Columbus by their persistently blowing in one direction.

2. When the Gulf Stream starts on its journey, its waters are heated to a temperature of eighty-four degrees. As it travels northward, it gradually loses this heat. By the time it reaches latitude fifty degrees, its waters stand at forty-eight degrees. Now it is a rule in nature that nothing is lost. What then becomes of this heat? It escapes in two directions — above and below. Some part undoubtedly goes to warm the layer of cold water which really acts as the bed of the current.

3. And here we may notice what an advantage it is to us that the Gulf Stream does not actually touch the bed of the Atlantic. If this were the case, then we should be robbed of an enormous amount of heat, for the earth is a better conductor of heat than the water. Thus, by a special provision of nature, this current of warm water is

surrounded on three sides by matter which absorbs heat very slowly, leaving the bulk of the heat to be given off on its upper surface.

4. Again, water is seven hundred and seventy times heavier than air, and as nothing is ever lost, when a cubic foot of water parts with one degree of its heat, it will warm an *equal weight* of air one degree. That is, a cubic foot of water, in losing one degree, warms seven hundred and seventy cubic feet of air to a like extent. Now it is that we see how a small quantity of water will warm such an extent of air.

5. Now, the mass of water brought from the tropics to the temperate region of the earth by the Gulf Stream alone is two thousand times greater than the flow of the Mississippi. Thus it is that we in England feel, every time a westerly wind blows, the sunshine of the tropics, which has been bottled up for us, and gently given off by this mighty current.

6. Besides modifying climate, the great **currents** of the ocean thoroughly **mix the water.** About thirty-five in a thousand parts of sea water are common salt. It is a marvellous thing, when we think of it, how evenly this salt is distributed in the waters of the ocean. In Arctic seas, where there is little evaporation and much melting ice and snow, the water is almost as salt as in the tropics, where the evaporation is excessive.

7. But for ocean currents, we should have enormous accumulations of salt near the tropics, and in all land-locked seas like the Mediterranean and Red Seas. Huge beds of salt would be formed; and, in time, the Mediterranean and Red Sea would be blotted from the map.

8. We must not forget another use of oceanic currents. They **assist commerce.** The great ocean trade routes are controlled by the direction of the currents. Steamers from America to England adopt a northerly course in order to "descend upon England," whilst in the return journey they steer to the south in order to cheat the current. In the old sailing days, the captains who knew how to take advantage of the Gulf Stream gained sixty or seventy miles a-day on those who did not know of the existence of that current.

9. In winter this knowledge was especially valuable, for in the short compass of one hundred miles the sailor passed from mid-winter to a summer heat. After struggling amongst icebergs and snowstorms, he would suddenly pass into the warm current, where he could bathe his stiffened limbs in tepid water.

49.—OCEAN CURRENTS.—II.

GENERAL CAUSES.

1. If we have two unstable bodies standing side by side, and free to move, the heavier of the two will lean towards the lighter. This occasionally

happens on a grand scale in nature. Let us take the case of the air first. A high barometer, at a certain place, means that the air is heaped up there, and is really heavier than, say, at another place five hundred miles off, where the barometer is low. The air is an unstable body, and it is free to move; therefore, a current will set in from the region of high pressure to that of low pressure.

2. The same thing takes place in the ocean, If there is any cause in operation which tends to make the water heavier in one place than in another, then currents will be set up from the region of heavy water to that of lighter water.

3. Now, in nature such an operation is always going on in the tropics. There, evaporation is taking place on an extensive scale. It is calculated that at least twenty-five feet of water are annually evaporated in the region of the equator. The exact effect of this evaporation is to take away fresh water, and leave the salts behind. Salt water is heavier than fresh; therefore, we have a region of heavy water; and, on either side, a region of fresher and, therefore, lighter water.

4. According to the rule we have laid down, a system of currents will be set up, and it is interesting to notice exactly how these currents will behave. Maury, in his *Physical Geography of the Sea*, gives us an illustration which will enable us to see exactly what would happen.

5. Let us suppose the case of a vat of oil and a vat of wine connected by means of a narrow trough. Suppose the trough to have a flood-gate, which is closed until we are ready for the experiment. The moment the flood-gate is opened, what will happen? The heavier wine will rush towards the lighter oil, and in order to maintain the level of the two fluids, the oil must either be heaped up or flow towards the wine as an upper current, whilst the heavier wine will force its way into the oil vat, but as an under current.

6. We shall show, later on, that this is exactly what does happen in the case of the Mediterranean, Red Sea, and Persian Gulf.

7. It is also a rule in nature that water will find its own level. Wherever we find running water, it is obeying this rule. The mountain torrent, the stately river, and the mighty ocean itself, must all conform to this apparently simple law, which knows no exception. If, then, we have any cause in operation which tends to lower the level of the ocean in one place or raise it in another, currents would again be set up.

8. As we have already shown, excessive evaporation is competent to produce this change of level. There is, in the neighbourhood of the tropics, an immense hollow being formed by the sun's rays. Every day three-quarters of an inch of water is transformed into vapour. The hollow thus formed

must be filled up somehow. This accounts for that gentle drift which sets in from the poles to the equator. It is so slow as scarcely to be measurable, and so gentle in its movement as not to injure the most fragile shells which cover the bottom of the Atlantic.

9. So we see that evaporation produces currents in two ways. It makes water heavy by making it salter, and it also produces changes of level, and in both cases water rushes in from elsewhere to restore the equilibrium.

50.

1. Now, if the amount of water which flowed from the poles to the equator was equal in quantity to that evaporated by the sun's rays, then no return currents would set in from equator to poles. All Arctic currents would be arrested at the tropics. But we know that this is not so. Several well-defined streams in both the great oceans, Atlantic and Pacific, can be distinctly traced. Therefore, forces are at work, other than evaporation, to produce this effect.

2. The rotation of the earth on its axis is undoubtedly one of the forces we are looking for. As we have already pointed out in dealing with the tides, particles of water do not cohere like those which compose the solid crust of the earth. Near the region of the equator, the earth is travel-

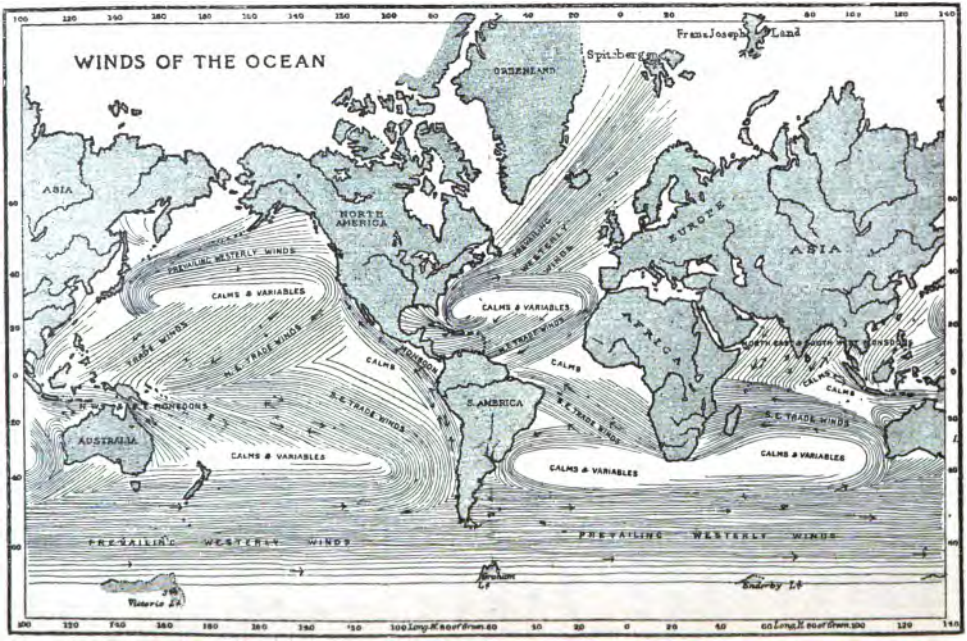
ling at the rate of one thousand miles an hour; the water cannot keep up with the solid crust, and lags behind, forming a current which flows from east to west.

3. In the deep waters of the Atlantic, this current forms a broad belt on either side of the equator, and can be distinctly traced from the shores of Africa to those of America. This huge stream is really the parent of all the great Atlantic currents, and is known as the Equatorial Current.

4. In the Indian and Pacific Oceans, this current is not quite so apparent. The smallness of the one, and the numerous archipelagos of the other, prevent its fullest development. But everywhere in the equatorial zone we meet with traces of it.

5. Another force which acts as a current producer, is to be found in those regular winds which blow over certain quarters of our globe. You may remember, perhaps, that the crew of Columbus were terribly frightened by winds which blew day after day in the same direction. These winds are now no longer dreaded by the mariner. The Spaniards who followed Columbus called the waters over which they blew "The Ladies' Seas," as a girl might be entrusted with the helm, so steadily did the breezes blow in these parts.

6. The practical English have christened these the trade winds, so much does their persistent


WINDS OF THE OCEAN
Franz Joseph Land
Spitzbergen
GREENLAND
ASIA
NORTH AMERICA
EUROPE
ASIA
PREVAILING WESTERLY WINDS
CALMS & VARIABLES
TRADE WINDS
N.E. TRADE WINDS
S.E. TRADE WINDS
CALMS
S. AMERICA
AFRICA
NORTH EAST & SOUTH WEST MONSOONS
AUSTRALIA
CALMS & VARIABLES
PREVAILING WESTERLY WINDS
Victoria Ld.
Graham Ld.
Enderby Ld.

regularity help the commerce of this country. For two hundred days, out of the three hundred and sixty-five, these winds may be counted upon to blow the surface waters gently in one direction. Once the waters are set in motion, they are not easily stopped; and thus, even on calm days, currents may be traced which are obviously due to the winds of preceding days.

7. It is true that Captain Maury altogether denies that the great Atlantic currents can in any way be caused by the trade winds. He does not deny that local currents, such as are found in the Baltic and Mediterranean, are mainly caused by the wind; and he shows that when the wind dies down the currents cease, which is not the case with the Gulf Stream and the Japanese current.

8. The great English astronomer, Sir John Herschel, however, maintained that the trade winds were the sole cause of the Gulf Stream at least. He asserts that the winds do not pile the waters up, but that they roll the particles of water before them, very much as billiard balls are rolled over a table by gentle strokes from a cue.

9. Recent researches have tended to support Herschel rather than Maury, whose theory is so plausibly stated as almost to carry conviction. The latter writer asserts that the difference in weight between the heavy salt waters of the

tropics and the light and less salt waters of the poles, is sufficient to produce all the great currents we shall have to study in the next few chapters.

51.—OCEAN CURRENTS.—III.

THE GULF STREAM.

1. Whether we believe in Captain Maury's theory or not, we cannot but admire the patient research and literary skill which have given us his great work, *The Physical Geography of the Sea.* Nowhere, perhaps, are the many physical facts connected with the ocean more clearly or more beautifully stated than in this book, which every boy should read.

2. Here is the epic language in which he begins his account of the Gulf Stream—"There is a river in the ocean; in the severest drought it never fails, and in the mightiest floods it never overflows. Its banks and its bottom are of cold water, whilst its current is of warm. It takes its rise in the Gulf of Mexico, and empties into the Arctic Seas. This mighty river is the Gulf Stream.

3. "There is in the world no other such majestic flow of waters. Its current is more rapid than the Mississippi or the Amazon, and its volume more than a thousand times greater!" Other writers have also waxed eloquent over this ocean river. A learned French author says—"Without doubt, there is no marine current which deserves

better to be known in all its details; none has been of more importance in the commerce of nations, or exercises a greater influence upon the climate of North-Western Europe. It is to the Gulf Stream that the British Isles, France, and the neighbouring countries, owe, in great part, their mild temperature, their agricultural wealth, and, in consequence, a very considerable part of their material and moral power."

4. The total warmth of the current would suffice, if it was centred in a single point, to fuse mountains of iron, and cause a river of metal as mighty as the Mississippi to flow forth. It would suffice, also, to raise from a winter to a constant summer temperature the entire column of air which rests over England and France.

5. Owing to the warmth of its waters, the lakes of the Faröe and Shetland Islands never freeze during winter, Great Britain is enveloped in fogs as in an immense vapour bath, and the myrtle grows on the shores of Ireland, the "Emerald Isle of the seas," under the same latitude as Labrador—that land of snow and ice.

6. But, if in its gentler moods it brings us a softer climate and tepid waters, it also has its stormy side. The Gulf Stream is the great weather breeder of the Atlantic. In its course follow all those hurricanes which strew our coasts with wreck and disaster, and bring sorrow to many

a sailor's home. It is a true "storm king" in its more terrible moments.

7. It is indeed, to quote Reclus, "the great serpent of the Scandinavian poets, which uncoils its immense folds across the ocean, and from its head, which it waves here and there over the shores, wafts a gentle breeze, or pours forth storms and lightning."

8. The existence of the Gulf Stream was known as early as 1513. The Spaniards were the great maritime people of that age; and, when anxious to reach home from the West Indies, they allowed their ships to drift through the Straits of Florida, and descend gently on Spain. Since that time, every navigator, who sails these seas, either seeks to take advantage of the current, or avoids it if he can.

9. The sailor can easily tell when he is in the waters of the Gulf Stream. He is then surrounded by water of a deep blue colour. So pronounced is the colour and temperature, that often a vessel may be seen floating one half in the tepid waters of the Gulf Stream, whilst the other half floats in the colder and greener waters which hem it round.

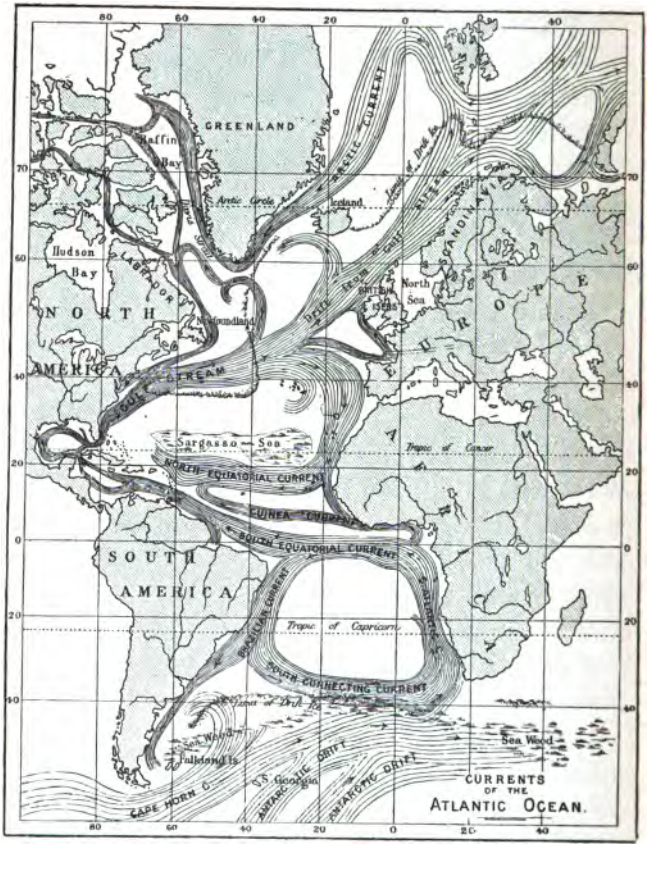
10. Often, great streaks of warm blue water become detached from the main stream, and refuse to mingle with the waters around. These alternate streaks of warm and cold water were, at first, a great puzzle to sailors; and, even yet, they do not cease to excite the wonder of all who see them.

52.

1. In tracing the course of the Gulf Stream, a convenient place to begin is the entrance to the Caribbean Sea. Here, an immense body of water is daily poured into this land-locked sea by the Equatorial Current. From thence, it finds its way into the Gulf of Mexico; and, passing between the North of Cuba and the peninsula of Florida, takes for the first time the name of the Gulf Stream.

2. As it issues through these straits, it resembles a broad river of warm water, thirty-seven miles wide and twelve hundred feet deep. Its speed is great, equalling, in fact, the flow of the great rivers of the earth, being sometimes from four and a-half to five miles an hour. When compared, however, in volume with the great rivers of the world, it far exceeds the greatest of them, being two thousand times greater than the Mississippi. And yet it was to the outflow of this great river that many learned men thought the Gulf Stream owed its existence.

3. As the Gulf Stream is mainly caused by winds, so its speed and volume both vary as the winds vary. A succession of north-easterly winds will check its northward flow, and a much less quantity of water will find its way into the open ocean. On the other hand, favouring gales will cause its waters to rise, and swell, and spread with


GREENLAND
Baffin Bay
Arctic Circle
Iceland
Hudson Bay
NORTH AMERICA
Newfoundland
LABRADOR CURRENT
ARCTIC CURRENT
GULF STREAM
Sargasso Sea
NORTH EQUATORIAL CURRENT
GUINEA CURRENT
SOUTH EQUATORIAL CURRENT
BRAZILIAN CURRENT
BENGUELA CURRENT
SOUTH CONNECTING CURRENT
SOUTH AMERICA
Tropic of Capricorn
Tropic of Cancer
EUROPE
BRITISH ISLES
North Sea
Sea Weed
Falkland Is.
CAPE HORN C.
S. Georgia
ANTARCTIC DRIFT
CURRENTS OF THE ATLANTIC OCEAN.

fury over the low lands on its borders. Sometimes, it ravages vast tracts, and causes whole islands to disappear.

4. Every boy who lives near a river will have noticed how the current has a tendency to eat away one bank, and deposit sand and gravel on the other. This great ocean-river acts exactly in the same way. The coasts of Florida are continually being eaten away, whilst the Bahamas have been built up on a foundation of submarine banks partly deposited by this great salt river.

5. As the Gulf Stream flows northward, it spreads out, becoming wider, shallower, and colder. Off Cape Hatteras, it is only seven hundred and twenty feet deep, or little more than half its depth at starting; but it is twice as wide as when it passed through the Straits of Florida. When it reaches our latitude, it has become a huge sheet of shallow water, reaching from the Azores to Iceland and Spitzbergen.

6. When off Cape Cod and New York it changes its direction, and flows towards the east. Captain Maury shows that if a cannon ball could be sent through the Straits of Florida with force enough, it would be deflected against the coast of America, and reach Europe exactly in the course followed by the Gulf Stream.

7. Just off the banks of Newfoundland the Gulf Stream meets a current of cold water from the

Arctic Ocean. The old navigator Cabot knew all about this cold current; and, whilst this meeting of warm and cold waters brings mist and fog to the American coasts, it also gives, as a sort of compensation, an abundant supply of fish.

8. The spot where this meeting of the waters takes place is not by any means constant. From September to March—that is, during the winter—the cold water drives the Gulf Stream towards the south. Again, from March to September, the warm water has the upper hand, and forces the Arctic Current back to higher latitudes.

9. We can easily understand this when we remember that winds, currents, and rains are dependent really on the sun; that during our summer he is north of the equator, and the whole system of physical disturbances takes place in the northern hemisphere, whilst matters are reversed during the winter months.

10. Thus we see, that, whilst as far as forty degrees north latitude the Gulf Stream has a more or less fixed course, beyond that point it undulates, as Maury says, like a pennon in a breeze.

53.

1. Here, we must turn aside for a moment, and point out a geological work which is going on in this part of the Atlantic. There is being built up, at this meeting-place of the waters, an enormous

plateau, which will eventually result in a new continent. The Arctic Current brings down annually an enormous number of icebergs, which had their birth-place in the valleys of Greenland, or the rugged islands which surround the pole.

2. Every iceberg carries with it tons of rock and earthy matter, which are quietly let go into the depths of the Atlantic when the iceberg meets the tepid waters of the Gulf Stream. We may thus look upon the iceberg as a gigantic ocean carrier, which is slowly, but surely, transferring the soil of Arctic Greenland to form a new continent in mid-Atlantic.

3. What has already been done in this way we may partly compute when we study the banks of Newfoundland, which scientific men assure us are wholly due to the meeting of these two currents. These banks rise up suddenly, from water which is almost five miles deep, and form a plateau, on which icebergs are stranded by the hundred at certain times of the year.

4. The size of these icebergs is sometimes enormous. The *Acadia* met with one whose pinnacles were as high as the dome of St. Paul's. As the whole depth is something like ten times the visible height, this berg was more than four thousand feet thick. Again, icefields are often met, charged with rocky *débris*, measuring not less than fifty to one hundred miles in each direction.

5. We can easily see that such a berg, in melting, would discharge a cargo many times greater than the largest Cunarder. This, then, is Nature's method of bridging the Atlantic, and connecting the Old World with the New.

6. We might here point out that the whole of that fantastic beauty which captivates the beholder, when looking at an iceberg, is due to the warm waters of the Gulf Stream. When the iceberg leaves its Arctic home it is square-topped, but,

meeting the warm current, the water hollows out chambers and caverns, leaving here and there pinnacles and turrets of all shapes. This goes on until the berg becomes top-heavy. It turns over with a tremendous crash, revealing to the world those sculptured forms and gorgeous colouring which no artist has yet been able to imitate.

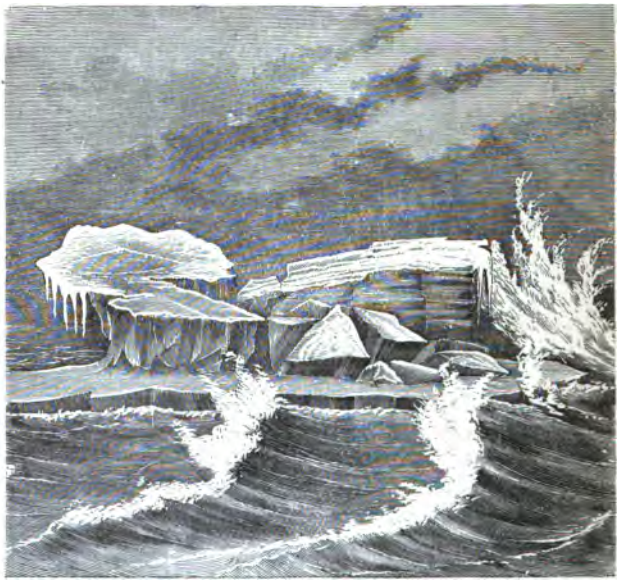
7. It is impossible to ignore the Arctic Current whilst describing the Gulf Stream. After meeting the latter at the surface, the colder current dives down, and actually flows under the Gulf Stream for a great distance. It may be traced as an under current as far as the Bahamas, where it is met with at a depth of twelve hundred feet.

8. The sounding-line and the thermometer assure us of its existence. We can ascertain its depth to a few feet, so rapid is the transition of the line from tepid to cold water. Were the waters of the Arctic Current and Gulf Stream of the same temperature, then a great conflict of waters might be expected in the neighbourhood of their meeting-place. But as cold water is heavier than warm, this conflict is settled by the Arctic Current becoming an under current.

9. Not only the thermometer, but the conduct of the icebergs, assures us also of this fact. They may be seen ploughing their way to the south-east, actually in opposition to the waters of the Gulf Stream, which they divide like the bow of

a ship. As we have already shown, the greater part of the iceberg is beneath the surface, and comes, therefore, within the influence of this under current.

10. We should mention here that only a part of the Arctic Current disappears in this way.



A WAVE-WORN ICEBERG IN THE GULF STREAM.

A part of it remains as a surface current, and can be traced as far as Florida, hugging the eastern sea-board of the States. This counter current interposes the waters of the Icy Sea between the coast of Carolina and the Gulf Stream, and bounds the great warm river like a wall of ice.

11. The colour of these two waters is very striking. The warm current is of a deep azure blue, whilst the cold current has a light greenish tint. So distinct is the line which separates one from the other, that a hand may be held in each, and the difference in temperature detected without a thermometer.

12. Often the friction of current against current produces a series of eddies or small whirlpools, exactly as we find the friction of a river against its banks gives the water at its edge a circular motion. So violent is this motion, that a dull, roaring noise can sometimes be detected where the waters contend on the surface of the sea.

13. At last the Gulf Stream loses itself in the waters off the coasts of North-Western Europe. It has done its great work of carrying away the heated waters of the tropics, and leaving them where the heat can be given off gradually, for the benefit of northern climates. It has also equalised the proportion of salt, which would tend to accumulate in one place, but for this and other great ocean rivers.

14. When it started on its journey, its waters contained thirty-seven parts of salt to every one thousand parts of water. Similarly, the Arctic Current had only thirty-three such parts. That the waters are thoroughly mixed we know, because the waters of Western Europe contain about thirty-

ARCTIC SCENE.

five parts of saline matter to one thousand parts of water.

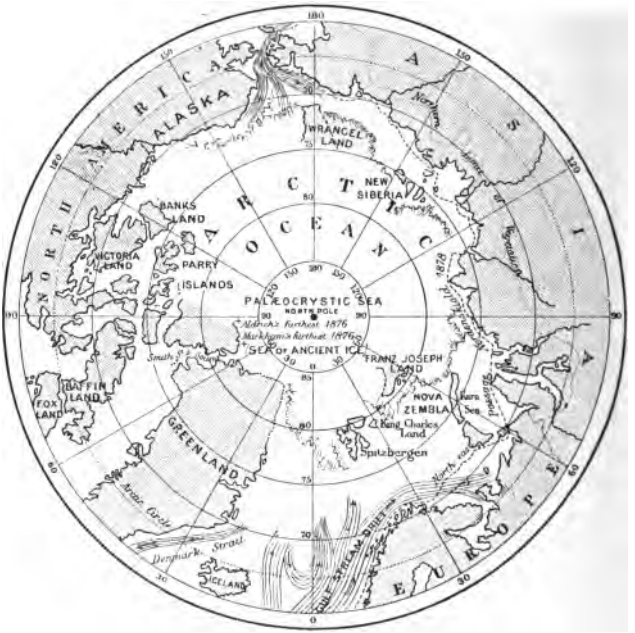
15. As to temperature. When it started, its waters were not less than eighty-six degrees. Where the Gulf Stream meets the Arctic Current, the temperature is about forty-five degrees. In the same latitude the waters from the Arctic Ocean are seven degrees below freezing-point; thus, in defiance of latitude, the waters of the tropics and poles are brought into juxtaposition.

54.—OCEAN CURRENTS.—IV.

THE OPEN ARCTIC SEA.

1. In the previous chapter we have said that the Gulf Stream finally loses itself in the North Atlantic. We must not, however, regard this as an altogether proven fact. There are, here and there, some indications that this great current pursues its course as an under current well nigh to the very pole of the earth.

2. All along the northern coasts of Siberia, we know that a cold current flows from east to west. It encounters on its way the large island of Nova Zembla, whose shores it covers with ice, and makes the climate so cold as to render the island uninhabitable. Arrested by this barrier, the current travels to the north-west, where it meets Spitzbergen, round the northern extremity of which it turns into the Greenland Seas.



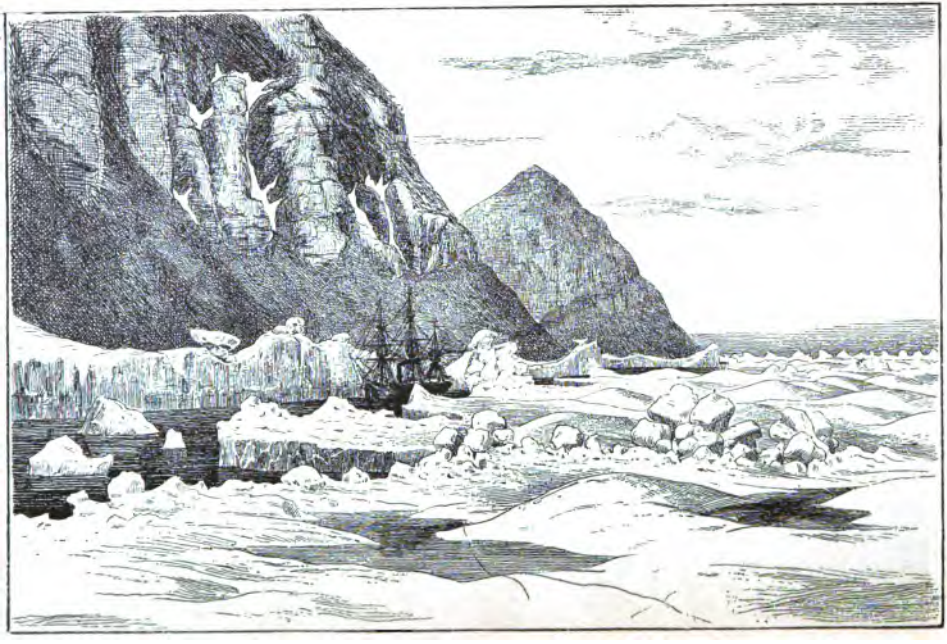
THE ARCTIC REGIONS.

3. Here it is deflected southwards, and becomes the Arctic Current we have referred to in previous chapters. All seamen who have ventured into these waters lying to the north-west of Iceland, have encountered this icy current flowing at a speed of three or four miles a-day.

4. To the south of Greenland, the now enfeebled Gulf Stream meets this cold current; and, probably, passes under it as a submarine current. We say probably, because no one has yet fully explored that land of mystery which lies around the North Pole. But we know that the polar basin must, somehow or other, be supplied with water to withstand the constant drain of the Arctic Current.

5. It has always been the dream of a certain school of navigators, that, around the pole, an open sea would be found. They based their calculations on certain observed facts, which in themselves were exceedingly interesting. Flocks of sea-fowl were often seen making their way to the north; seals and whales seemed to come from the north rather than the south, as if beyond the icy barriers, which prevented exploration, there lay a milder region, where food was obtainable.

6. Again, the Arctic expedition, which went in search of Franklin, saw, far to the north of them, a "water sky"—that is, a certain atmospheric condition which cannot be produced without open water. Dr. Kane, another Arctic explorer, actually



THE "ALERT" AMONGST THE ICE.

reached an open sea north of parallel eighty-two degrees.

7. To reach it, his party crossed a barrier of ice one hundred miles wide. Passing this ice-bound region, he stood on the shores of an iceless sea, extending in an unbroken sheet as far as the eye could reach towards the pole. Its waves were dashing on the beach with the swell of a boundless ocean. The tides ebbed and flowed within it, as in the mighty Atlantic and Pacific.

8. This was no rift in the ice, but a veritable ocean; and whence came its warm waters? Before gaining this open water, the temperature of the air was sixty degrees below zero; a thermometer dipped in this open sea registered thirty-six degrees. Was this the lost Gulf Stream, which, after gliding silently for a thousand miles under an icy barrier, came again to the surface to mitigate the intense rigour of an Arctic climate?

9. Does this open ocean constantly remain in the same place? or does it move as the Gulf Stream does, sometimes warming one region and sometimes another? Probably the latter, for Captain Nares, of the *Alert*, only found thick-ribbed ice where Kane had found open water. In the opinion of the leader of the last Arctic expedition, the open polar sea must be looked upon simply as a myth.

55.—OCEAN CURRENTS.—V.

OFFSHOOTS OF THE GULF STREAM.

1. Although we cannot say exactly what becomes of the Gulf Stream, we do know that it is the parent of certain currents which are more or less important. On the west coast of Greenland, a stream of water has been discovered which hugs the coast for about eight degrees of latitude. This was formerly looked upon as part of that great Arctic Current whose course we traced in the last chapter.

2. It has been shown, however, that its waters are from eight degrees to ten degrees warmer than those of the Polar Current, and that, in consequence, the climate of Western Greenland is to that extent warmer than the eastern side. The sea very seldom freezes on the shores which it reaches. It entirely ceases about latitude seventy-eight degrees, and becomes submarine, perhaps to flow on the surface again in the open sea of Kane.

3. It is also certain that a branch of the Gulf Stream penetrates into the Bay of Biscay, then turns south off the coast of Spain, and, flowing in a southerly direction, joins the great Equatorial Current, and before its existence was detected was the cause of much wreck and disaster. Vessels were continually being driven out of their bearings; but now its course has been mapped out, and wrecks are not nearly so frequent.

4. Rennel's Current completes that great ocean whirlpool which dominates the North Atlantic. Starting with the Equatorial Current, it passes entirely across the Atlantic, is deflected against the shores of America, becomes the Gulf Stream in the Northern Basin, and completes the circuit, as we have shown, by a small but important current off the coast of Spain and the Canaries.

5. In the centre of this immense whirlpool lies that great weedy mass which so frightened Columbus and his companions. It consists of patches of the Gulf weed, a marine plant which cover an area equal in extent to the Mississippi valley. To the eye, these patches look as if they could easily be walked upon, and are covered with shell-fish and a species of crab. The fronds of these gigantic sea-weeds are often ninety feet in length, and they lie floating in the direction of the prevailing wind.

6. It is easy to tell from what direction the wind is coming, blow it ever so gently. In a dead calm the position of the weeds indicates where the last breeze came from, for these plants are singularly sensitive to the slightest current. Columbus was the first to enter this weedy sea, and there it has remained to this day, moving up and down according to the seasons, the winds, and storms. This sea is usually avoided by navigators, as it retards the speed of their vessels. It is

almost impassable to steamers, as the weeds foul the screw and paddles.

7. There is more than one Sargasso Sea. Given an ocean with a system of currents, we can always point to the spot where weedy patches may be expected. There are traces of a Sargasso in the South Atlantic; another is found in the Pacific;

GULF WEED.

but neither are so well developed as the one in the North Atlantic.

8. After a careful study of the currents of the South Pacific, Maury came to the conclusion that

a Sargasso ought to exist somewhere between Chili and New Zealand. The logs of ship captains who had sailed these waters were thereupon asked for, and carefully examined. It was found there were frequent allusions to "patches of weed," and many small birds hovering over them. Thus, when the oceanic currents are accurately mapped out, we can easily say where the Sargassos will be found.

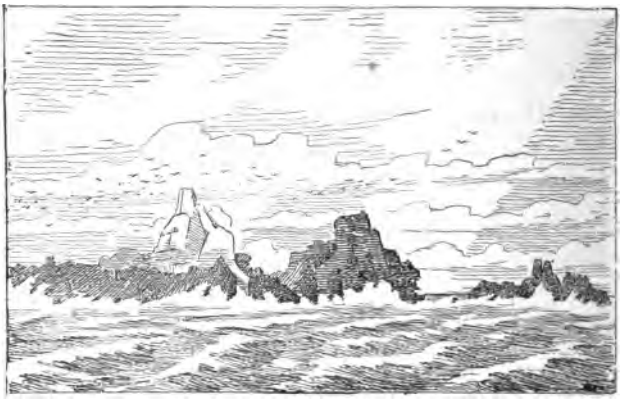
56.—OCEAN CURRENTS.—VI.

CURRENTS OF SOUTH ATLANTIC AND INDIAN OCEANS.

1. Hitherto we have been dealing almost solely with the North Atlantic, but the southern and really larger half of that ocean deserves a few words. Roughly speaking, the equator divides this ocean into two parts, and each has its own system of currents.

2. Starting again off the coast of Africa, we follow the great Equatorial Current as far as Cape St. Roque, the great promontory of Brazil. Here it splits into two parts—one to become the Gulf Stream, and the other flowing south along the coast of Brazil. This is really the Gulf Stream of the south. It can, however, be traced as far as the Falkland Islands, where it meets a glacial current from the Antarctic Ocean. This current runs in a north-easterly direction, and in the neighbourhood of St. Helena joins the great Equatorial Current.

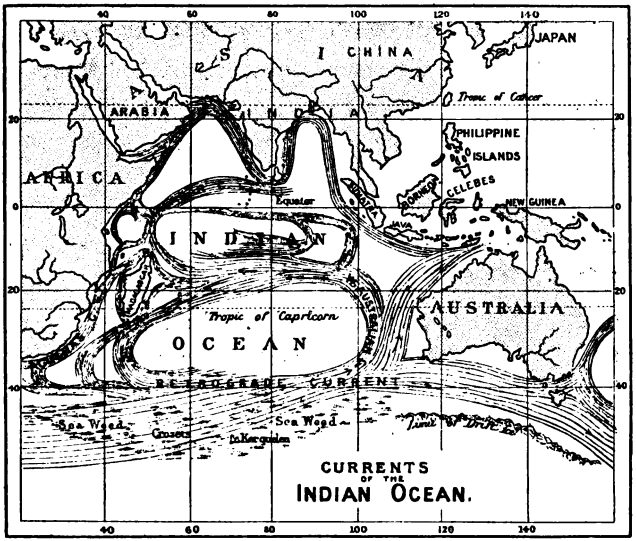
3. This immense circuit has been pretty accurately mapped out by means of bottles thrown overboard by merchant ships at various parts of the course; and by comparing entries in ships' log-books, we know that a drop of water is between two and three years in completing the journey we have just described.



ST. PAUL'S ROCKS (IN THE MIDST OF THE EQUATORIAL CURRENT.)

4. It may be here pointed out that the currents of the South Atlantic are not nearly so well defined as those in the northern half of the same ocean. The reason of this is not far to seek. The North Atlantic is shaped more like a huge canal, or a river with parallel banks; the waters are deflected from side to side, exactly as in any large brook. The banks help to keep the currents together.

5. In the South Atlantic the opposite shores diverge, and open funnel-shaped into the great South Polar Ocean. The waters expand with the



coast, and thus the currents lose that definition they had in the North Atlantic.

6. The **Indian Ocean** also has its system of currents. The evaporation here is between thirteen

and sixteen feet annually. This, in itself, would be sufficient to give rise to a general drift of water from the Antarctic Ocean into the warmer ocean to the north.

7. In the Gulfs of Bengal and Oman the currents change with the monsoons; and it is only north of Madagascar that we can trace a steady well-defined current all the year round. This is known as the Mozambique Current, and it passes between Madagascar and the mainland at a speed of 4½ miles per hour.

8. This current finally loses itself in the waters of the Antarctic Ocean, but not before a part of it has mingled with the great Atlantic whirlpool off the coasts of South Africa. As in the North and South Atlantic, we can trace a weedy patch in the centre of the eddy, where the waters have little or no motion.

57.—OCEAN CURRENTS.—VII.

PACIFIC CURRENTS.

1. The Pacific has not been so well studied as the Atlantic. The great trade routes for a long time lay around rather than across this great oval expanse of water. Again, it was found to be studded with innumerable archipelagos. These broke up and dispersed the currents; so that, for many years, the Pacific was regarded as a currentless ocean.

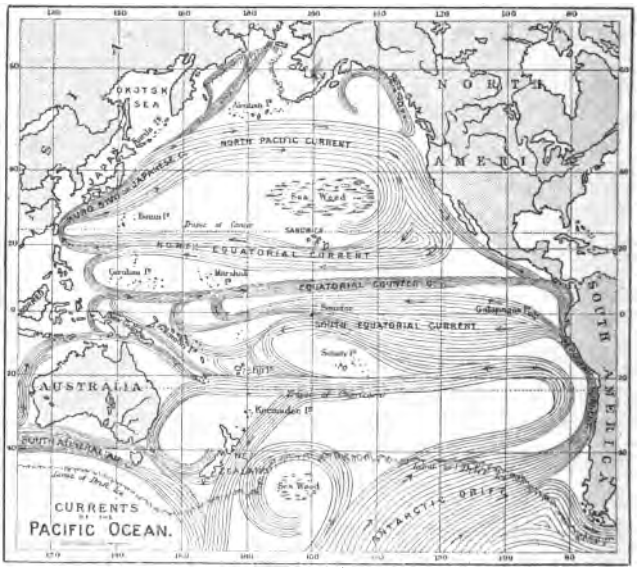
2. Nevertheless, we now know of one or two well-defined movements which merit a few words. An immense river of cold water, of whose depth and breadth we are yet ignorant, strikes against the island of Magellan, off South America. It is here divided into two currents, one of which passes to the east of the Falkland Islands, and joins the great round of waters between Africa and Brazil.

3. The other creeps along the western side of South America, and is known as **Humboldt's Current,** after the great traveller who first discovered its existence. This current plays an important part in modifying the climate of Chili and Peru. Wherever this cold water touches, it changes everything in its passage—the vegetation, the animal life, and even the history of mankind.

4. In the same latitude elsewhere, the coral polyp carries on its work: not a branch of coral can take root in these chilly waters, which are twenty degrees colder than the adjacent ocean. If the air were not constantly refreshed by this cool current, Chili and Peru would be uninhabitable, and the land, which is the driest in the world, would become another Sahara.

5. It has been noticed that the plant life of the shores washed by this cold current bears a remarkable resemblance to that of St. Helena, which lies for miles to the east. It may be that these waters, coming from the same great ocean

and carrying with them the same climate, influences to some extent the character of the vegetation, although the places lie four thousand miles apart.



6. Humboldt's Current travels at the rate of twenty miles a-day; and, gradually widening as it flows north, joins the Equatorial Current of the

Pacific. This is undoubtedly the greatest moving mass of water on the planet. Almost every other current can be said to begin and end there!

7. This great liquid mass has a breadth of three thousand miles, and it traverses from one hundred and thirty to one hundred and forty degrees of longitude—that is, more than one-third the circumference of the globe. Its depth has been estimated at about a mile; and, like Humboldt's Current, it travels about twenty miles a-day.

8. There are really three great forces which help this current on its way: the rotation of the earth on its axis; the trade winds; and the great tidal wave which, as we have shown elsewhere, travels from east to west.

9. The islands of the Pacific in some places disperse the current, and in some instances form eddies, which flow in the opposite direction to the parent stream. Having traversed the entire breadth of the Pacific, the Equatorial Current must of necessity change its direction. Like its namesake in the Atlantic it divides—one part to run south, past Australia and New Zealand, into the Arctic Ocean; the other part turns to the north, and becomes the "Black River" of the Japanese.

58.—OCEAN CURRENTS.—VIII.

THE JAPANESE CURRENT.

1. For centuries the Japanese have known of the existence of a marine current flowing past their coasts, helping their commerce, and giving them a milder climate than they were entitled to by the latitude of their islands. It is less rapid than the Gulf Stream, but has the same deep blue colour which, doubtless, earned for it the name it goes by in that country, the "Black River."

2. At Yeddo the waters of the Black River have a temperature of seventy-five degrees, which is ten degrees warmer than the surrounding waters.

3. Almost every noticeable feature in the Gulf Stream has its counterpart in this Black River of Japan. Just off the largest island it turns to the east, and just a little to the north a cold current issues from the Sea of Okhotsk, and causes damp fogs similar to those on the banks of Newfoundland. Here, again, shoals of fish congregate to feed on the animalculæ brought thither by the warm waters of this great river.

4. Like the Gulf Stream, the Black River or Japanese Current flows almost due east till it reaches the American shores, where it divides—one branch going into the icy sea of Behring, whilst the other turns south, flows along the shores of California, and finally rejoins the great parent of all the currents. These two currents

enclose a floating forest of sea-weed, not less extensive than the Sargasso of the Atlantic.

5. Unlike Humboldt's Current, which brings the iceberg from the Atlantic to cool the torrid shores of Chili and Peru, the Gulf Stream of the Pacific gives to Sitka and Vancouver the climate of Italy, and brings vapour and rainfall where only drought and cold could be expected from its geographical position.

6. It bears on its waves the fragments which it has picked up from the Moluccas, the Philippines, and Japan. It gives to the rock-bound treeless Aleutians a plentiful supply of drift-wood. The camphor wood of the tropics, and other odoriferous trees, are the common fuel of the sealer, and the blubber of the whale is often boiled down above fires fed by tropical timber.

7. This Black River earns its name in another sense. It was the highway for all sorts of waifs and disabled ships. Many a Japanese sailor was carried off against his will and landed on a foreign shore. Chinese records place the discovery of America from the West ten centuries before Columbus sailed from the East. Doubtless, the first discoverer was some current-driven mariner, who was fortunate enough to find his way back to tell his countrymen of "Fusang," the far-off land, now known as America.

8. It must be quite understood that neither the

Black River, nor any of the phenomena connected with it, have the same grandeur as the corresponding current in the Atlantic. The Pacific towards the north is more or less enclosed. The opening into this ocean from the Arctic Seas is only thirty miles wide, and the channel fifty fathoms deep; thus the mass of water finding its way from one ocean to the other is much less than in the case of the Atlantic and Pacific Oceans.

9. Very often the current from the Sea of Okhotsk is a mere surface drift, and is incapable of carrying more than a few sheets of floe or pack ice from one place to another. Thus there is no agency at work in the Pacific building up a new continent, as we attempted to show was the case in the Atlantic. The mariner meets with the fogs, but the great submarine banks and the towering icebergs are altogether absent in the Pacific.

59.—OCEAN CURRENTS.—IX.

CURRENTS OF THE BLACK, BALTIC, AND MEDITERRANEAN SEAS.

1. Very often there is connected with the great ocean currents we have described a secondary system, which runs in a course directly opposite to the main moving mass. Thus, even connected with the great Gulf Stream, there is a well-defined current of water running exactly in the opposite

direction, from Nicaragua to the mainland of South America. Lazy sailors, who are content with a speed of one mile an hour, have only to abandon themselves to the waves in any coasting voyage they may make between the above mentioned places.

2. Their bark may seem motionless; but after being eight or nine days out from Colon, the blue hills of Granada will be seen in the distance, although not a sail has been hoisted. Every here and there amongst the islands of the Pacific we meet with these secondary currents. They are really parts of the parent stream diverted, and completely change their direction in many instances.

3. The **Currents of the Baltic** are somewhat curious in their action, and often prove exceedingly dangerous to ships, especially in the narrow waters of the Sound and the two Belts. Every four days the surface current flows for forty-eight hours towards the Cattegat, then it flows back into the Baltic for one day, and then the day after there is no sensible movement in either direction. Often two currents can be traced one above the other: the fresh waters of the Baltic flowing out as a surface current, whilst the salter and heavier waters of the North Sea can be detected by the sounding-line flowing inwards.

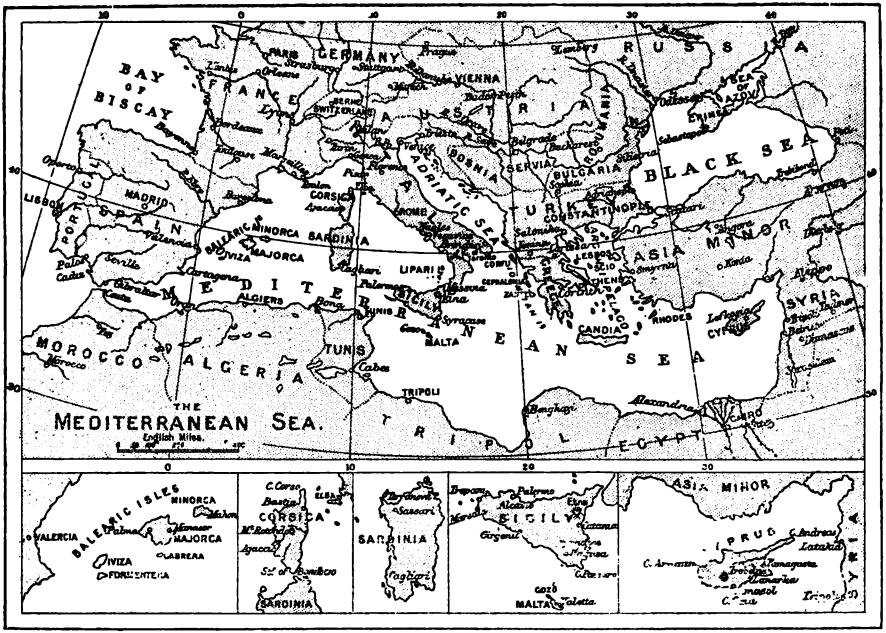
4. These movements are fairly regular in their action, and are evidently due to changes of level

produced by evaporation and precipitation. In hot weather, when evaporation is rapid, the currents are feeble; but in winter, when swollen rivers discharge more than the sun evaporates, then for days together strong currents flow past the islands of Denmark into the North Sea.

5. At the other extremity of Europe we have the **Black Sea.** At its outlet is the narrow channel of the Bosphorus, through which flows a steady current discharging nearly forty thousand cubic yards of water per second. This is twice as much as the volume of the Volga and all the other rivers of the Black Sea put together. What then keeps this current going? In time, the Black Sea, and its little offshoot the Sea of Azof, would be emptied. Here again an under current of salt and heavy water supplies the deficiency.

6. At the other end of the Mediterranean, remote from the Black Sea, this process is reversed. Through the Straits of Gibraltar there rushes a strong surface current from the Atlantic. In the old days of sailing ships, it was impossible to pass through the Straits in the face of a westerly wind — this current was too much for the smartest seamanship. This inrush brings the comparatively fresh waters of the Atlantic into the Mediterranean, which may be looked upon as a huge evaporating basin.

7. Only twenty inches of rain fall annually in


THE
MEDITERRANEAN SEA.
English Miles.
BAY OF BISCAY
FRANCE
GERMANY
AUSTRIA
HUNGARY
RUSSIA
SWITZERLAND
VIENNA
PARIS
BOHEMIA
SERVIA
BOSNIA
BULGARIA
BLACK SEA
SEA OF AZOFF
ADRIATIC SEA
CONSTANTINOPLE
TURKEY
ASIA MINOR
SPAIN
PORTUGAL
MADRID
LISBON
BALEARIC
MINORCA
SARDINIA
MAJORCA
IVIZA
CORSICA
LIPARI
MEDITERRANEAN SEA
ALGIERS
TUNIS
MALTA
CANDIA
RHODES
CYPRUS
SYRIA
MOROCCO
ALGERIA
TRIPOLI
EGYPT
ALEXANDRIA
CAIRO
BALEARIC ISLES
VALENCIA
MINORCA
MAJORCA
IVIZA
FORMENTERA
CORSICA
SARDINIA
SICILY
MALTA
ASIA MINOR
CYPRUS

the area which drains into this land-locked sea, but over fifty inches is given off in the same time by evaporation. Thus the Atlantic is called upon to give of its abundance to its outlying limb. It has been calculated that the Mediterranean loses by evaporation three times as much as it gains from the Danube, Nile, Rhone, &c., all put together.

8. Now we see why a current should set in from the Atlantic, and also why it should be a surface current. But, if the Atlantic supply only equalled the amount evaporated, then, the bed of the Mediterranean would, in time, become a huge plateau of salt: for as the waters got heavier and bluer, small crystals would form exactly as they do in the salt-pans at Droitwich. These would fall to the bottom and there remain, the super-salted water above being unable to dissolve them.

9. As we know that no salt-bed is being formed in this manner, we might reasonably infer that this heavy salt water escapes somehow into the open Atlantic. We are not surprised, therefore, when the sounding-line reveals the existence of a deep under current, which acts as a great ocean regulator; and prevents the silting up of that tideless sea which has played such an important part in the history and civilisation of Europe.

60.—OCEAN CURRENTS.—X.

THE RED SEA CURRENT.

1. Perhaps nowhere have we a grander illustration of the disturbance produced by evaporation than in the Red Sea. It lies in what may be considered an absolutely rainless region. Throughout its fifteen hundred miles of length it receives not a single brooklet worthy of being named on a map. It is simply a long, narrow gulf separating the desert of Arabia from that of Egypt.

2. The sun is here set in a cloudless sky; and, from sunrise to sunset, for the greater part of the year, there is brilliant sunshine. No wonder, then, that the Red Sea is selected in order to show what is the result of unaided evaporation acting on a narrow sheet of water. The portion of fluid transformed into vapour is nearly an inch a-day; that is, thirty feet per annum.

3. If this sea were blocked at the Straits of Babel-Mandeb, so as to imprison the waters, it would be completely dried up in sixty years. As it is, the northern extremity is two feet lower than at the entrance of the sea; for even a strong current from the Indian Ocean cannot supply water quickly enough to keep the waters at the same height throughout the entire length of the gulf.

4. The excessive evaporation tells at once upon

the specific gravity of the water. From thirty-nine parts of salt in a thousand of water at Babel-Mandeb, it rises to forty-three in a thousand at Suez; that is, four per cent. of the waters of the Red Sea is composed of pure salt. This sea may be regarded as the scene of natural salt-works on a grand scale.

5. Everywhere round its edges are found shallow salt-encrusted bays; and some maintain that the reddish tinge, which gives this sea its name, is due to the shells and other remains of infusoria which have been killed by the growing saltness of the water. Maury also points out that water highly charged with salt often assumes a reddish tint.

6. Dr. Buist, who gave much time to the study of the Red Sea, says that if these super-salted waters did not run off again into the ocean, they would in less than three thousand years fill up the entire gulf with solid salt. Now, we know that the Red Sea has existed for more than three thousand years, and that its waters, although salter than those of other seas, have not yet reached their point of saturation.

7. We therefore come to this inevitable conclusion, that a very salt submarine current must flow through the Straits of Babel-Mandeb towards the Indian Ocean to prevent this silting up of the Red Sea. So that, given the general condi-

THE COAST OF THE RED SEA.

tions which prevail over any land-locked sea, that is, its climate and amount of rainfall, we can confidently predict the direction of its principal currents; just as, given the temperature of the air inside a room, and that outside, we know exactly what will happen if we open the window.

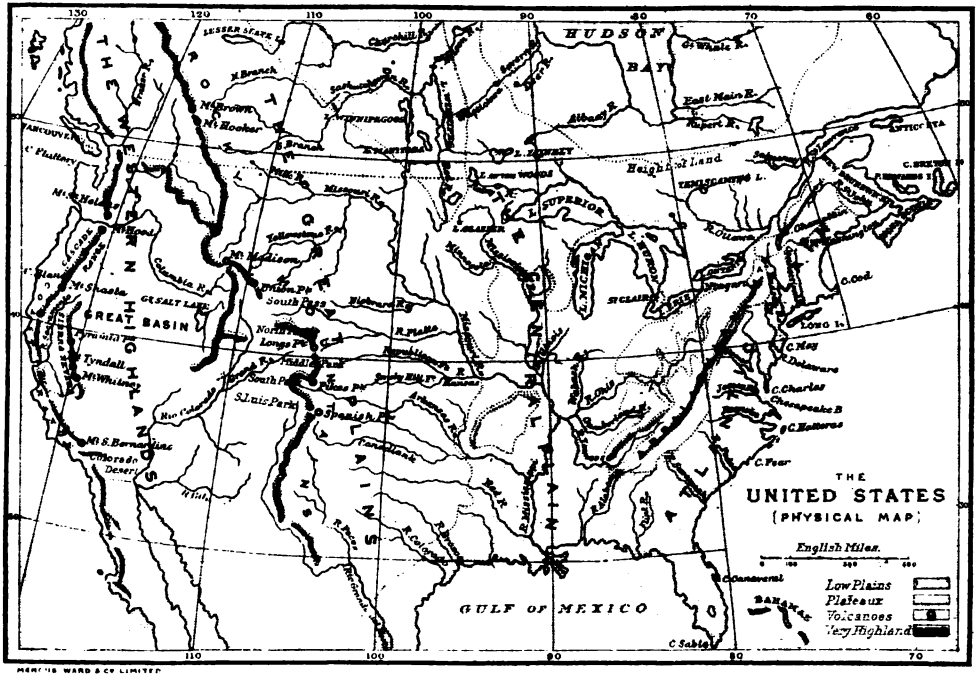
8. We have now described the principal currents of the sea. We have shown how they are caused; how they modify climate, and produce that general uniformity which characterises the ocean, no matter from what place we see it. We have named and traced the chief of these oceanic rivers, and it only remains now to point out the wonderful symmetry that exists when we look at a current chart of the world.

9. Almost every liquid mass that has motion in the northern hemisphere has its counterpart south of the equator. It is possible to trace in each of the great oceans, Atlantic and Pacific, two distinct systems, which, although they have minor differences, yet bear a striking resemblance to each other. Generally speaking, the currents run in pairs, and wherever we find a "sea-river" of warm water we have not far to look for the corresponding current of cold water which restores the harmony and equilibrium of the ocean.

GEOGRAPHY

OF THE

UNITED STATES



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THE UNITED STATES.

I.—Position, Area, and Surface.

The **United States** occupy the central portion of North America.

They extend from the *Dominion of Canada* on the north, to the *Gulf of Mexico* on the south; and from the *Atlantic Ocean* on the east, to the *Pacific Ocean* on the west.

The **Boundaries** of the United States are:—

On the **North,** the *49th parallel* of north latitude, the *Rainy River*, the *Great Lakes*, the provinces of *Quebec* and *New Brunswick;*

On the **East,** the *North Atlantic Ocean;*

On the **South,** the *Gulf of Mexico*, the *Rio Grande*, and the *Mexican Republic;*

On the **West,** the *North Pacific Ocean.*

The total **area** of the United States, including the Territory of Alaska, is over *three and a-half millions of square miles.*

Its average **length,** from east to west, is about 2,500 miles; and its average **breadth,** from north to south, about 1,300 miles.

The **surface** of the United States presents two nearly equal divisions of widely different aspect—a *high western* half, and a *low eastern* half.

The **Western half of the United States** consists of *broad highlands*, divided by the Rocky Mountains into two nearly equal portions.

The eastern half of this region consists of gently descending slopes, known as the **Great Plains.**

Large tracts, in this region, consist of successions of *rolling plains*, which gradually increase in elevation from the east, until, at the base of the Rocky Mountains, they reach an elevation of from five thousand to six thousand feet.

With the exception of the *Missouri* and *Yellowstone*, the rivers which cross these plains are too swift and too shallow to be navigable, their average fall being five feet to the mile.

The *Red* and *Arkansas* rivers, however, are navigable in the eastern lowland.

The western half of the Highland, known as the **Plateau Belt,** is bounded by the *Rocky Mountains* on the east, and by the low *Coast Ranges* on the shores of the Pacific on the west. Between these, but nearer the Coast Ranges than the Rockies, are the lofty ranges known as the *Sierra Nevada* and *Cascade Mountains.*

The *Sierra Nevada*, *Cascade*, and *Rocky Mountains* are the loftiest ranges in North America. They average from nine thousand to twelve thousand feet in height, and include many peaks of over fourteen thousand feet.

The elevated tract within these lofty mountain walls consists of three principal plateaux. It is ribbed with numerous short parallel mountain-chains, and has been said to resemble a sea filled with waves many thousands of feet in height.

The **Great Basin** occupies the central portion of the Plateau Belt.

It encloses *Great Salt Lake* and some others, which have no outlet to the ocean, and is separated from the *Colorado Plateau* by the range of the *Wahsatch Mountains*, which is from three thousand to four thousand feet above the level of the sea.

The **Colorado Plateau** occupies the south-eastern part of the Plateau Belt.

It is from six thousand to seven thousand feet high.

The **Plain of Columbia** occupies the northern part of the Plateau Belt.

It is about two thousand feet above the Pacific Ocean, and about a thousand feet above the Columbia River.

Three large and rapid **rivers** drain the greater part of this Plateau Belt—the *Columbia*, the *Colorado*, and the *Rio Grande*.

The *Columbia River* breaks through the lofty Cascade Range, and flows into the Pacific Ocean.

The *Colorado River* reaches the Gulf of California, after passing through a number of great *cañons*, which constitute a series of the most frightful mountain-gorges in the world.

The *Rio Grande* flows from the mountains bordering the Colorado Plateau through a long, narrow, elevated valley to the Gulf of Mexico.

The beds of nearly all the rivers of the entire highland region are far below the general level of the country through which they flow.

The Western Highlands have a warm and very dry **climate**.

The warm south-west winds from the Pacific discharge most of their moisture, as rain and snow, on the high cold slopes and summits of the Sierra Nevada and Cascade Ranges, and much of the remaining portion upon the lofty summits and slopes of the Rocky Mountains. The *plateaux* are, consequently, *dry* and *barren*, whilst the *coast regions* receive abundant rains, and, particularly towards the north, are clothed with *dense forests*.

Similarly, the winds from the Atlantic and Gulf of Mexico lose their moisture before they penetrate so

far inland; and, in consequence, a large part of the great plains at the foot of the Rocky Mountains is one of the most desolate and arid regions of the continent. Cacti and sage-bushes are the characteristic forms of vegetation, and they indicate a very dry climate.

Wherever the streams from the melting snows of the mountains can be used for irrigation, abundant crops can be raised; but the greater part of the highland is hopelessly barren.

The chief wealth of the Western Highlands is in the exhaustless mines of *gold*, *silver*, and other valuable **minerals** with which the entire mountain district abounds.

Nowhere else on the globe is there known to be such rich deposits of the precious metals. There are hundreds of thousands of square miles rich with ores of gold and silver.

Between the Western Highlands and the Pacific Ocean lies the small rich lowland of the **California Basin.**

The **Eastern half of the United States** presents a strong contrast to the western half; for it is fertile and well watered throughout. It contains the Eastern Highlands and two important lowland plains.

The **Eastern Highlands** are low, when compared with the western. They consist of the several parallel ranges of the **Appalachian system,** and extend from the Dominion of Canada almost to the Gulf of Mexico.

Their highest peaks are about as lofty as the plains at the foot of the Rocky Mountains; they contain

many fertile elevated valleys, but no extensive plateaux. These highlands are rich in water-power and in mines of coal and iron.

At the nearest approach of these mountains to the Atlantic coast they are intersected by a remarkable depression in which the *Hudson* and *Mohawk* rivers flow; and this depression forms an important commercial highway.

The Eastern Highlands divide the lowlands into two unequal portions—the **Atlantic Plain,** on the east, and the Great Central, or **Mississippi Plain,** on the west.

The **Great Central Plain** extends from the Gulf of Mexico, on the south, to the Great Lakes, on the north; and from the foothills of the Rocky Mountains, on the west, to the Appalachian Chain, on the east.

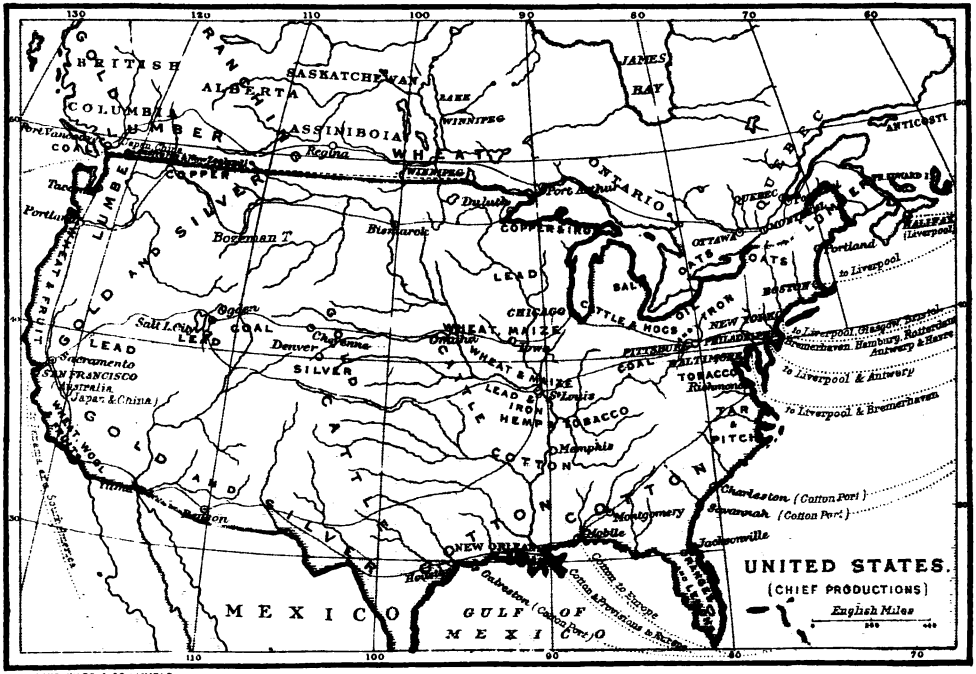
The **Basin of the Mississippi** includes, not only most of the Great Central Plain, but all the land between the crests of the Rocky Mountains, on one side, and those of the Alleghanies on the other.

It has been likened to a broad trough, the Mississippi lying in the lowest part.

The **Atlantic Plain** is a long strip of lowland between the Alleghany Mountains and the Atlantic Ocean.

It is widest at the south, but narrows rapidly towards the mouth of the Hudson River, where it almost disappears; further east, it again widens to the Gulf of Mexico.

The *Rivers of the Atlantic Plain* cross it at right angles to the line of elevation in which they have their sources. Most of them are navigable till inter-



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rupted by falls or rapids at some distance from the sea. These falls furnish valuable water-power, and have ruled the location of many flourishing cities.

Note that the Atlantic Plain is drained by numerous short, separate, and parallel rivers, and all the rest of the country by a few great river systems.

The **climate** of the eastern half of the United States is, in general, much cooler than that of the Western Highlands in the same latitude.

Frequent *rains* are brought, at all seasons of the year, by the moist winds from the Gulf of Mexico, the Atlantic, and the great lakes.

The *rain-fall*, on the Atlantic coast, increases as we advance to the south; on the Pacific coast, towards the north.

The winters of the eastern half of the United States are long and severe in the north, but mild in the south; the summers are generally hot.

Dense *forests* cover the Atlantic plain except where cleared for cultivation, and immense *prairies* occupy the western parts of the Great Central Plain.

The Prairie region is broad in the north and narrow in the south. It suffers from long and frequent summer droughts; but these do not prevent the extensive culture of wheat and other grains, which are produced in enormous quantities. The prairies are rapidly being converted into farms intersected with hedgerows and dotted with orchards.

The southern portions of both plains constitute the region of abundant summer showers, without which *cotton* could not be cultivated. *Rice, sugar-cane, maize,* and *tobacco* are also largely grown.

Large **Wild Animals**, such as *wolves, wild-cats, panthers, bears,* and *deer*, once abounded; but the country now contains millions of domestic animals, such as *cattle, sheep, swine,* and *horses.*

The chief openings in the **Coast Line** are:—

On the **East**, *Cape Cod Bay, Nantucket Bay, Long Island Sound,* mouth of the *Delaware River,*

Chesapeake Bay, *Albemarle Sound*, *Pamlico Sound*, and *Long Bay*, on the Atlantic coast; on the **West**, *Monterey Bay*, *Bay of San Francisco*, the mouth of the *Columbia River*, and the *Gulf of Georgia*, on the Pacific coast; on the **South**, *Tampa* and *Galveston Bays*, on the Gulf Coast.

The chief **Capes** are:—

On the **East**, *Cod*, *May*, *Charles*, *Hatteras*, *Look-out*, *Fear*, and *Florida*, on the Atlantic Coast; on the **South**, *Sable*, the southern point of Florida; on the **West**, *Concepcion Point*, and *Capes Blanco*, *Disappointment*, and *Flattery*.

The **Islands** are numerous, but not very important. *Long Island* is the largest.

Of **Mountains**, there are three great systems:—

1. The **Appalachian**, or Alleghany system, with local names, as the *Green Mountains*, of Vermont; the *White Mountains*, of New Hampshire; the *Adirondacks*, of New York; and the *Alleghany Mountains* proper, south of the Hudson.

2. The **Rocky Mountain System.** These run through the entire continent, and consist of bold and lofty peaks, arranged in parallel lines. The highest points are *Long's Peak*, *Pike's Peak*, *Freemont's Peaks*, and *Mount Shasta*.

3. The **Pacific Mountain System** consists of ranges running parallel to Pacific Coast, the chief of which are—*Sierra Nevada*, *Cascade Range*, and

Pacific Coast Range. Highest Peaks, *Mounts Hood* and *St. Helens.*

The chief **Plains and Plateaux** are:—

1. The **Great Western Tableland,** between the Rocky Mountains and the Pacific Coast Range, consisting of fertile tracts interspersed with saline wastes.

2. The **Great Basin,** containing Great Salt Lake.

3. **Great Central Plain,** lying between the Alleghanies and Rockies. It is cut in two by Mississippi. In it lie the great Prairies.

4. The **Atlantic Plain** lies between the Atlantic and the Alleghany Mountains. It is low and swampy in places.

There are **Four River Systems,** three oceanic, and one continental:—

1. The Atlantic System, the chief rivers of which are—the *Merrimac, Connecticut, Hudson, Delaware, Susquehanna, Potomac,* and *James Rivers,* all between 300 and 400 miles long.

2. The **Gulf System,** the principal rivers of which are the *Alabama* and *Mississippi,* rising in Lake Glazier, and receiving on the right bank *Arkansas, Red River,* and *Missouri;* on the left, the *Ohio.* The **Missouri** receives the *Yellowstone, Platte,* and *Dakota;* and the **Ohio** has the *Tennessee, Cumberland,* and *Wabash* running into it.

3. The Pacific System; chief streams—*Colorado, Sacramento,* and *Columbia.*

4. The **Continental System,** or Rivers of Great Interior Basin. These do not flow into the open ocean, but into salt lakes, *Humboldt River* being the chief.

There are **two systems** of Lakes in the United States.

I. The **Great Lakes** connected with St. Lawrence :—

1. Lake Superior, 32,000 square miles, *i.e.*, as large as Ireland.
2. Lake Huron, 23,000 square miles.
3. Lake Michigan, 23,000 square miles.
4. Lake Erie, 7,800 square miles.
5. Lake Ontario, 6,900 square miles.

Between the last two are the Falls of Niagara.

II. **Lakes of the Great Interior Basin** :—

Great Salt Lake, 1,875 square miles; and Lakes Utah, Pyramia, Mono, and Tulare.

The United States may be divided into three distinct zones in respect of **Climate** :—

1. The **Atlantic Slope,** having a *climate of extremes*—cold in winter, warm in summer.

2. The **Pacific Slope,** having a climate resembling that of Western Europe, *temperate* and *fairly moist.*

3. An **Interior Region,** comprising the Rocky Mountains and the Great Basin. The *air* is *dry,* and *extremes* of heat and cold *very great.*

The **Vegetable Productions** of the United States consist of :—

1. **Cereals**—*maize, oats, wheat, barley, rye*—grown principally in northern states and California.

2. **Cotton,** grown in southern states *around the Mississippi.*

3. **Tobacco,** grown in Southern States chiefly.

4. **Sugar,** cultivated in *Louisiana, Florida, Texas,* &c.

5. All domesticated **animals** thrive—the **wild animals** are in some cases dying out, as *buffalo* and *beaver.* The *grizzly bear, panther, white-headed eagle, pigeons, grouse, turkeys, alligators,* and *rattle-snakes* are still found.

The country has immense **mineral resources.** All the precious metals and useful minerals are found in enormous quantities. **Coal-fields** abound. The principal are :—

1. The Great **Appalachian** coal-field, area 70,000 square miles.

2. The **Michigan** coal-field, area 15,000 square miles.

3. The **Kentucky** coal-field, area 50,000 square miles.

4. The **Arkansas, Missouri,** and **Iowa** coal-field, area 57,000 square miles.

Iron is found almost everywhere.

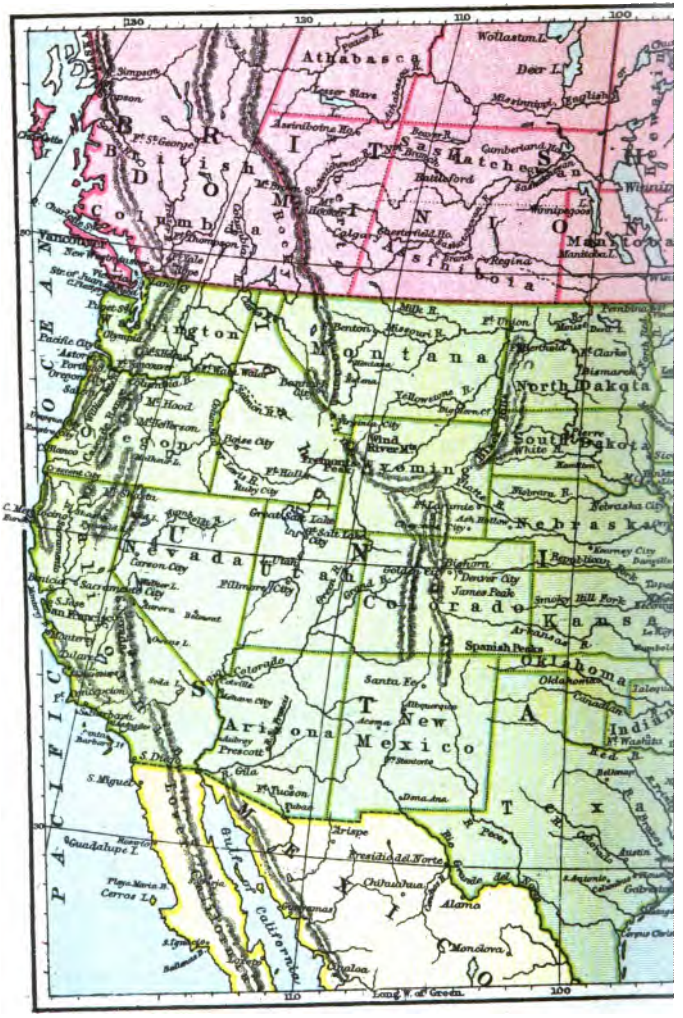
Silver is worked in *Colorado, Utah, Nevada,* and *California.*

Gold is found in *Rocky Mountains* and *Pacific Slope.*

Copper is found around *Lake Superior.*

Lead is mined in *Colorado, Missouri, Kansas,* &c.

Petroleum is found in *Pennsylvania.*


Athabasca
Wollaston L.
Deer L.
Winnipeg
Manitoba
Saskatchewan
Alberta
British Columbia
Vancouver I.
Washington
Oregon
Montana
North Dakota
South Dakota
Wyoming
Nebraska
Nevada
Utah
Colorado
Kansas
Oklahoma
Arizona
New Mexico
Texas
Indian
Pacific Ocean
Gulf of California
Long. W. of Greenw.

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POLITICAL GEOGRAPHY

OF THE

UNITED STATES.

The United States, including Alaska, consist of **forty-four states** and **six territories,** united under a general government.

The Population, in 1890, was nearly sixty-three millions.

Over fifty-nine-and-a-half millions of these are settled on the east of the Rocky Mountains; only about three millions residing on the west of that range.

The white race numbered about fifty-five millions. They are chiefly the descendants of emigrants from England, Ireland, and Germany.

The coloured population numbered over seven-and-a-half millions, made up as follows:—

Negroes, over six-and-a-quarter millions; mulattoes, over one million—these being the descendants of slaves originally brought from Africa; Chinese, over one hundred thousand; Japanese, two thousand; Indians, over three-hundred-and-fifty thousand.

The following table gives the exact figures according to the census of 1890:—

Whites ...	54,983,890	Negroes	6,337,980	Japanese ...	2,039
Coloured	7,998,354	Mulattoes	1,132,060	Indians ...	367,005
Total ...	62,982,244	Chinese...	107,475	In Alaska...	31,795

STATES AND CHIEF TOWNS.

Atlantic States.

NORTHERN ATLANTIC AND NEW ENGLAND STATES.

STATE.	CAPITAL.	CHIEF TOWNS.
1. Maine	Augusta... ...	Portland, St. Joseph (52)
2. New Hampshire	Concord	Manchester (44)
3. Vermont ...	Montpelier ...	Rutland
4. Massachusetts ...	Boston (448) ...	Boston (448), Worcester (85), Lowell (78), Fall River (74), Cambridge (70), Lynn (56), Lawrence (45), Springfield (44), New Bedford (41), Sommerville (40)
5. Rhode Island ...	{ Providence (132) Newport	Providence (132)
6. Connecticut ...	Hartford ...	New Haven (81), Bridgeport (49)

MIDDLE ATLANTIC STATES.

STATES.	CAPITAL.	CHIEF TOWNS.
7. New York ...	Albany	New York (1,515), Brooklyn (806), Buffalo (256), Rochester (134), Albany (95), Syracuse (88), Troy (61), Trenton (57), Utica (44), Hoboken (44)
8. New Jersey ...	Trenton	Newark (182), Jersey City (163), Paterson (78), Camden (58)
9. Pennsylvania ...	Harrisburg ...	Philadelphia (1,047), Pittsburg (239), Alleghany (105), Scranton (75), Reading (59), Erie (41)
10. Delaware ...	Dover	Wilmington (61)
11. Maryland ...	Annapolis ...	Baltimore (434)
District of Columbia ...	...	Washington (230)

SOUTHERN ATLANTIC STATES.

STATE.	CAPITAL.	CHIEF TOWNS.
12. Virginia ...	Richmond (81) ...	Richmond (81)
13. North Carolina	Raleigh	Wilmington
14. South Carolina	Columbia ...	Charleston (55)
15. Georgia	Atlanta (66) ...	Atlanta (66), Savannah (43)
16. Florida	Tallahassee ...	Key West

CENTRAL STATES.

NORTH CENTRAL STATES.

STATE.	CAPITAL.	CHIEF TOWNS.
17. Ohio	Columbus (88) ...	Cincinnati (297), Cleveland (261), Toledo (81), Dayton (61)
18. Indiana... ...	Indianapolis (105)	Indianapolis (105), Evansville (51)
19. Illinois	Springfield ...	Chicago (1,100), Peoria (41)
20. Wisconsin ..	Madison... ...	Milwaukee (204)
21. Michigan ...	Lansing	Detroit (206), Grand Rapids (60), Saginaw (46)

SOUTH CENTRAL STATES.

STATE.	CAPITAL.	CHIEF TOWNS.
22. West Virginia ...	Wheeling ...	Wheeling
23. Kentucky ..	Frankfort ...	Louisville (161)
24. Tennessee ...	Nashville (76) ...	Nashville (76), Memphis (64)
25. Alabama . .	Montgomery ...	Mobile
26. Mississippi ...	Jackson	Vicksburg

WEST CENTRAL STATES.

STATE.	CAPITAL.	CHIEF TOWNS.
27. Minnesota ...	S. Paul (133) ...	Minneapolis (165)
28. Iowa	Des Moines (50)	Des Moines (50)
29. Missouri ...	Jefferson City ...	St. Louis (452)
30. Arkansas ...	Little Rock ...	Little Rock
31. Louisiana ...	Baton Rouge ...	New Orleans (242)

Western, or Highland States.

States of the Plain.

State.	Capital.	Chief Towns.
32. North Dakota ..	Bismarck ...	
33. South Dakota ...	Pierre	Fargo
34. Nebraska ...	Lincoln (55) ...	Omaha (140)
35. Kansas	Topeka	Kansas City (133)
36. Texas	Austin	Galveston

Rocky Mountain and Basin States.

State.	Capital.	Chief Towns.
37. Montana ...	Helena	Helena
38. Wyoming ...	Cheyenne ...	Cheyenne
39. Colorado ...	Denver (107) ...	Denver (107)
40. Idaho	Boise City ...	Boise City
41. Nevada ...	Carson	Virginia City

Pacific States.

State.	Capital.	Chief Towns.
42. Washington ...	Olympia ...	Seattle (43)
43. Oregon	Salem	Portland (46)
44. California ..	Sacramento ...	San Francisco (299), Los Angeles (50), Oakland (49)

Territories.

Territory.	Capital.	Chief Towns.
1. Arizona	Prescott ...	Tuscon
2. New Mexico ..	Santa Fé ...	Santa Fé
3. Oklahoma ...	Oklahoma ...	
4. Utah	Salt Lake City (45)	Salt Lake City (45)
5. Indian Territory		
6. Alaska		

N.B.—The numbers in parenthesis ( ) give the population of cities and towns to the nearest thousand.

Railways.—Greater mileage than the whole of Europe; 148,000 miles open for traffic. Has **three lines which cross the Continent** from East to West.

1. Southern Pacific Railway.—From *New Orleans to California.*

2. Union Pacific Railway.—From *Chicago* to *San Francisco,* passing Iowa, Omaha, Cheyenne, and Sacramento. At Sherman is the highest railway station in the world.

3. Northern Pacific Railway.—From *Duluth* on Lake Superior to *Admiralty Inlet,* Puget Sound, passing Bismarck, Alexander, Helena, &c.

Other lines are—

1. **East Coast Line,** connecting *Boston, New York, Philadelphia, Baltimore,* Washington, Richmond, and *New Orleans.*

2. **West Coast Railway** running parallel with the Pacific Coast, and *joining* the *termini of* the *three Pacific Railways.*

3. **Pennsylvania Railway** connects *New York* with *Chicago, St. Louis,* and *Cincinnati.*

Commerce.—Imports—Sugar, woollen goods, coffee, silk, iron and steel goods, cotton goods, flax, jute, hides, &c.

Exports—Raw cotton, grain, flour, provisions, petroleum, tobacco, timber, sugar, cattle.

Value of imports, £150,000,000.

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Value of exports, a little more.

Is the third commercial nation in the world.

Sea Ports—1. **New York,** at mouth of Hudson.

2. **Boston,** in Massachusetts.
3. **San Francisco,** in California.
4. **Philadelphia,** on Delaware River.
5. **Baltimore,** on Chesapeake Bay.
6. **New Orleans,** near mouth of Mississippi.
7. **Savannah,** in Georgia.
8. **Galveston,** in Texas.

Government.—The Republic consists of one Federal District, six Territories, and 44 States. As population increases, Territories become States.

Each State has its own parliament, and makes its own laws, which, however, must not interfere with those of any other State.

The Central **Legislative Assembly** at Washington consists of a *House of Representatives* numbering 356 members. This resembles our House of Commons.

The **Senate** consists of two members from each State. These are elected by the local parliament of each State.

The **President** is chief magistrate, and commander-in-chief of army, navy, and militia. He is elected for four years.

TIDES.

1. What they are.—The regular rising and falling of the waters of the ocean. This rise varies from a few inches in the open Atlantic to about 50 feet in Bristol Channel.

2. What they do.—Fill up bays and estuaries twice a-day with great masses of water. Make shallow harbours and rivers navigable. Tend to make a level plateau of sand, gravel, or shingle between high and low water mark.

3. Cause of Tides.—The moon is the great cause, but the sun also helps. As the earth turns on its axis, the waters facing the moon are drawn up into a kind of "hump." A corresponding "hump" or mound is formed on the other side of the globe. This gives rise to two tides each day. There are two tides in every twenty-four hours fifty minutes. Roughly speaking, the tides at any given place are an hour later each day.

Spring Tides.—Twice a-month the tides are very high. This is caused by sun and moon either acting together or in opposition to each other. These high tides are called spring tides.

Neap Tides are caused by sun and moon being at right angles to each other. These tides are lower than spring tides, and occur at first and last quarters of the month.

Birthplace of the Tides.—The tides un-

doubtedly originate in that vast ocean which surrounds the South Pole. Here the tidal wave travels at the rate of 1,000 miles an hour, giving off branches which penetrate into Atlantic and Pacific Oceans.

Course of the Tidal Wave.—Starting at high water at Cape Horn, the tidal wave, in twelve hours, traverses the entire Pacific obliquely to Kamtschatka. Twenty-four hours after starting, it also reaches New Zealand. Five hours after leaving New Zealand it reaches South Africa. It courses the Atlantic from Cape of Good Hope to Cape Hatteras, reaching there about forty hours after it started. Some six hours later it reaches the English Channel and North Sea.

1. Tideless Areas.—Nearly all enclosed seas, as Baltic and Mediterranean. Off the mouths of the Mississippi and La Plata; certain areas in Irish and North Seas upon which the tides turn.

2. Phenomenal Tides.—Bristol Channel, 50 feet; St. Michael's Bay, Normandy, 45 feet; Persian Gulf and Yellow Sea, 36 feet.

3. Strong Tidal Currents prevail in Pentland Firth, among Hebrides, Channel Islands, and among the Lofodens in Norway.

4. Bores occur where the tidal wave forces its way into narrowing channels; the waters are heaped up, as in Severn, Amazon, Ganges, Seine, and many of the Chinese rivers.

Ocean Currents.

1. What they are.—Water in motion in some particular direction. As a rule the movements are slow, from ten to fifty miles a-day; but some, as in Gulf Stream, run from four to five miles an hour.

2. Kinds.—*Constant* and *variable.* The first flow continuously in one direction, as the Gulf Stream and Equatorial Current. The variable depend upon direction of wind or inequalities in floor of the ocean, or amount of evaporation or precipitation.

3. Causes.—

1. *Rotation of Earth* on its axis, as Equatorial Current.
2. The *Winds*, as Gulf Stream and Japanese Current (both, however, assisted by the rotation of the earth).
3. *Differences in density* of salt water, as currents of Mediterranean, Red and Black Seas.
4. *Evaporation* and precipitation, as in case of Baltic.

Atlantic Currents.

1. Equatorial Current is a broad belt lying north and south of Equator. It flows from Africa to South America, where it splits into two parts. One part flows south, and becomes the

2. Brazil Current, which hugs the coast of Brazil, and loses itself in waters of South Polar Ocean. The other part of Equatorial Current flows north into Caribbean Sea, from which it emerges as the

3. Gulf Stream, whose warm waters can be

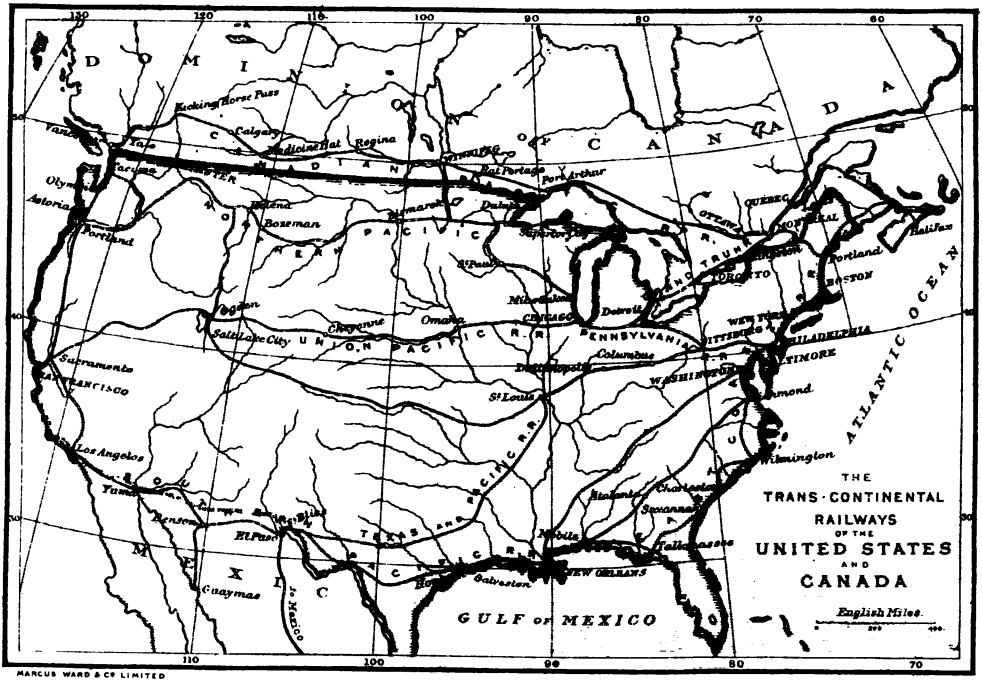
distinctly traced from the Gulf of Mexico to the British Isles. This current issues through the Straits of Florida at a speed of nearly five miles an hour. It is thirty-two miles wide, and very deep, but it gradually gets shallower, wider, and cooler, spreading out like a fan in the North Atlantic. It flows due north at first, but gradually takes an easterly course as the velocity at which the earth revolves decreases. Its great work is to modify the climate of the British Isles and Western Europe. It also helps navigation, and is the course along which the Atlantic storms travel.

4. Arctic Current.—This flows south from Baffin's Bay, and hugs the American coast as far as Cape Hatteras. The meeting of this current and the Gulf Stream causes the fogs which prevail at certain seasons of the year on the Banks of Newfoundland.

CURRENTS OF PACIFIC.

1. Equatorial Current starts a short distance from the west coast of America, and can be traced, with certain interruptions caused by island groups, to the Philippines.

2. Japanese Current, or Black Stream of the Japanese, follows a course in the Pacific similar to the Gulf Stream in the Atlantic. Its waters are warmer, salter, and darker than the waters which surround it. It modifies the climate of British Columbia.



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3. Antarctic Drift Current.—This is a slow, general movement of the waters of the South Polar Ocean towards the western shores of South America. It hugs the coast of Chili and Peru, and is there known as

4. Humboldt's Current, after its discoverer. It cools the torrid shores of Chili and Peru, and gives the people of these countries a good supply of edible fish.

MINOR CURRENTS.

1. Mediterranean Currents.—These consist of a *surface* current of comparatively fresh water from the Atlantic to supply the water lost by evaporation. There is also an *under* current of heavy salt water into the open Atlantic. This under current prevents the silting up of the Mediterranean with salt.

2. Red Sea Currents.—These consist of surface and under currents similar to those of Mediterranean.

3. Baltic and Black Sea Currents.—These are the reverse of the two described above. As precipitation is in excess of evaporation, the fresh water flows out as a surface current, whilst the under current consists of heavy salt water from adjoining seas or oceans.

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